# Governor Brian Schweitzer

## MONTANA ENERGY FOR CALIFORNIA MARKETS

# MONTANA

## Economy is Strong

- 7th fastest growing economy in U.S. last 3 years (... though spotty)
- Unemployment rates in 2005 lowest ever calculated (4.0%)
- Current unemployment rate (2%) lowest in nation
- Record number of jobs in 2005 (483,000)

# MONTANA

## Comparative Advantages

- Minerals
- Forest Products
- Agriculture
  - **Bio-fuels**
- **Energy**
  - **Coal**
  - **Wind**
  - **Oil & Gas**

- **Fuel Cells**
- **Bio-mass**
- **Ethanol**
- **Bio-diesel**
- **Coal mines**
- **Coal to gas**
- **Coal to liquid**
- **Coal to electricity**
- **Wind Farms**
- **Exploration**
- **Production**
- **Refineries**

# MONTANA

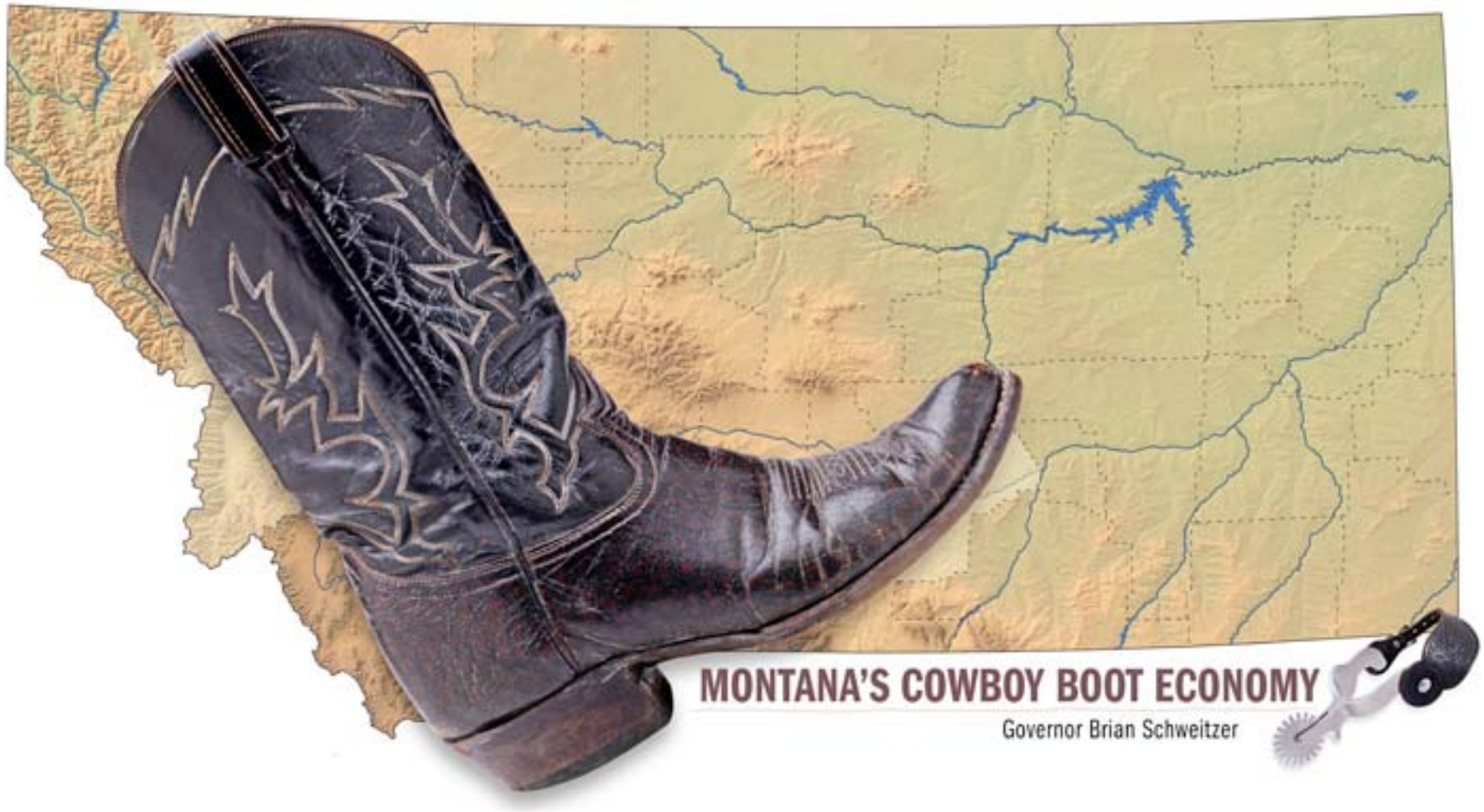
## Vigorous Leadership

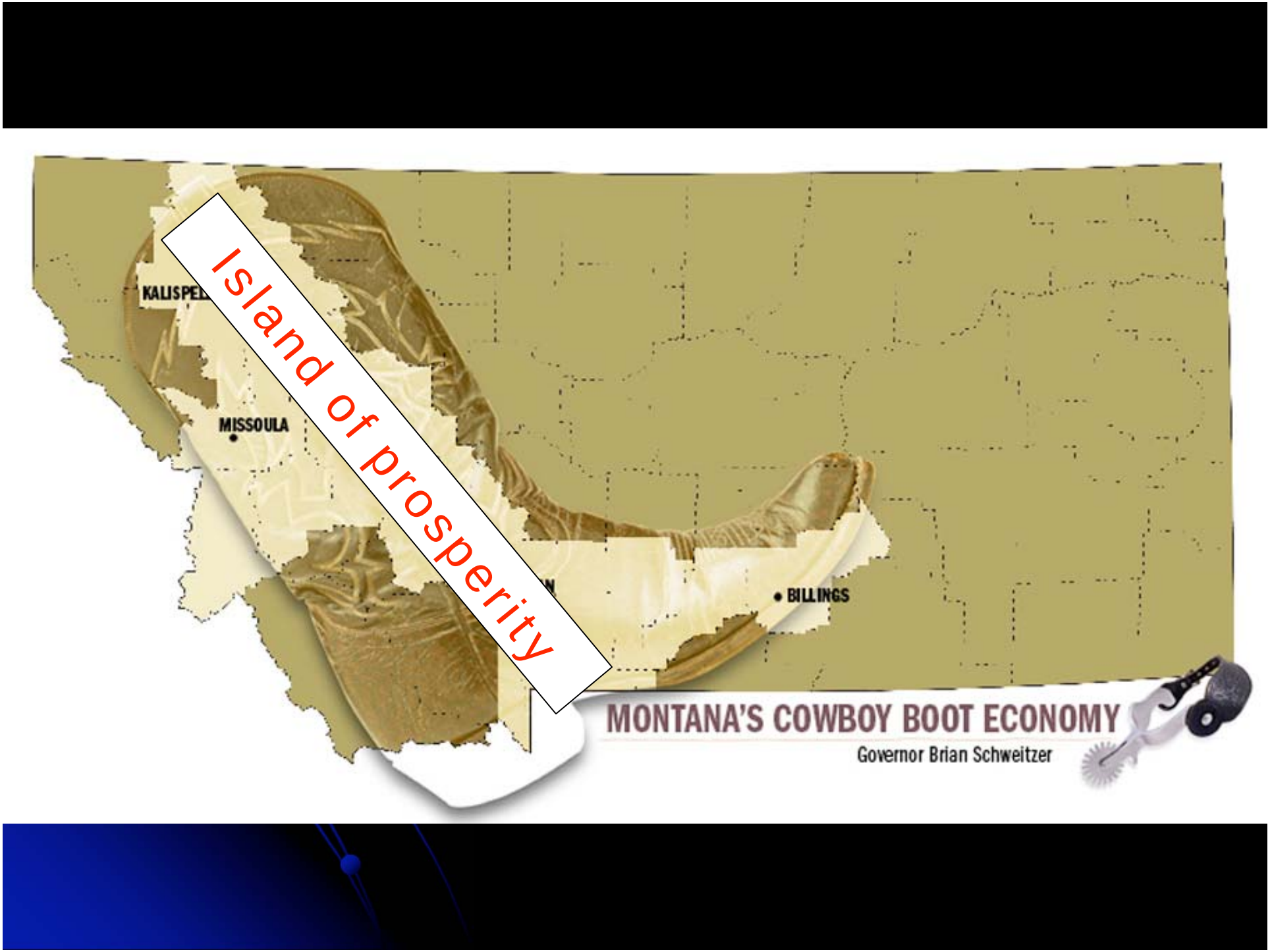
### Governor Schweitzer

- Not a career politician – first elected office
- Scientist - International agri-businessman
- “Can do” attitude
- Intelligent & creative
- Will work with everyone
- Visionary leader

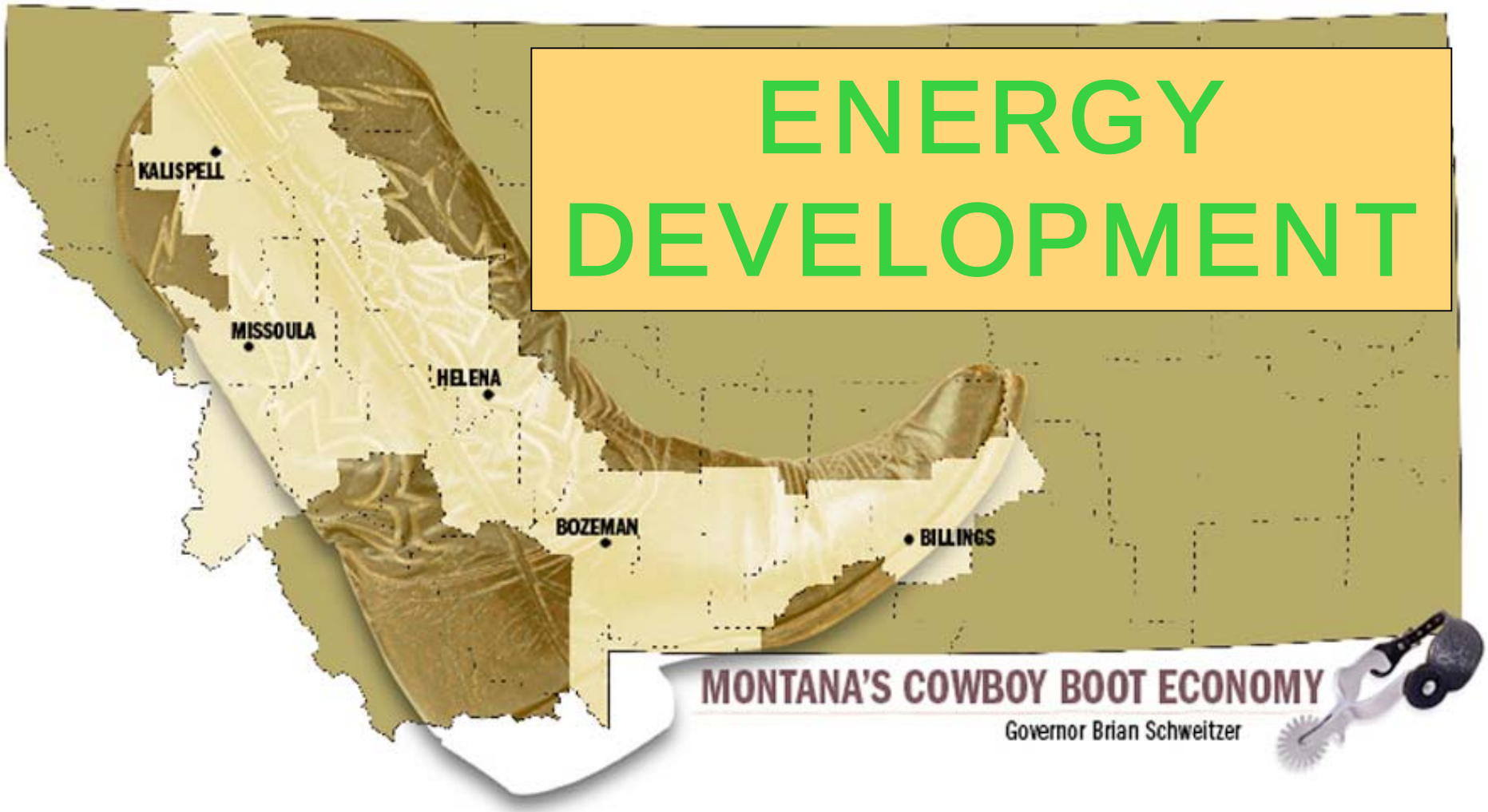
# Governor Schweitzer's
## Economic Development Vision

- Strengthen & diversify state's economy
  - Resource sector
  - Manufacturing sector
  - Technology sector
  - Research & Developm't
  - High-end Service sector
  - Tourism sector
- Increase # of jobs available
- Increase quality of jobs
  - Higher salaries
  - Better benefits, including health insurance
- Geographically disperse jobs
  - In Indian Country
  - Inside "The Boot"
  - Outside "The Boot"


MONTANA'S COWBOY BOOT ECONOMY
Governor Brian Schweitzer


Island of prosperity
MISSOULA
BILLINGS
MONTANA'S COWBOY BOOT ECONOMY
Governor Brian Schweitzer

# "OUTSIDE the BOOT" POTENTIAL



# MONTANA

## Schweitzer Energy Policy for "Outside the Boot"

- Take advantage of all of our energy advantages
- Do it right – quality jobs with a quality way of life
- "Clean & Green" for ourselves and to meet market demand

# MONTANA

## Energy Policy Impacts

- International – Global climate change
- National – Energy independence
- State – Economic development in areas that suffer chronic dislocation

# MONTANA

## Helping Solve America's Energy Independence Challenge

- US oil consumption – 6.5 Billion bbls/yr
- Domestic production – 2.5 Billion bbls/yr
- Shortfall – 4 Billion bbls/yr
- Strategy for Energy Independence
  - Conserve/Efficiency -- 1 Billion bbls/yr
  - Bio-fuels – 1 Billion bbls/yr
  - Coal-to-liquid – 2 Billion bbls/yr

# MONTANA

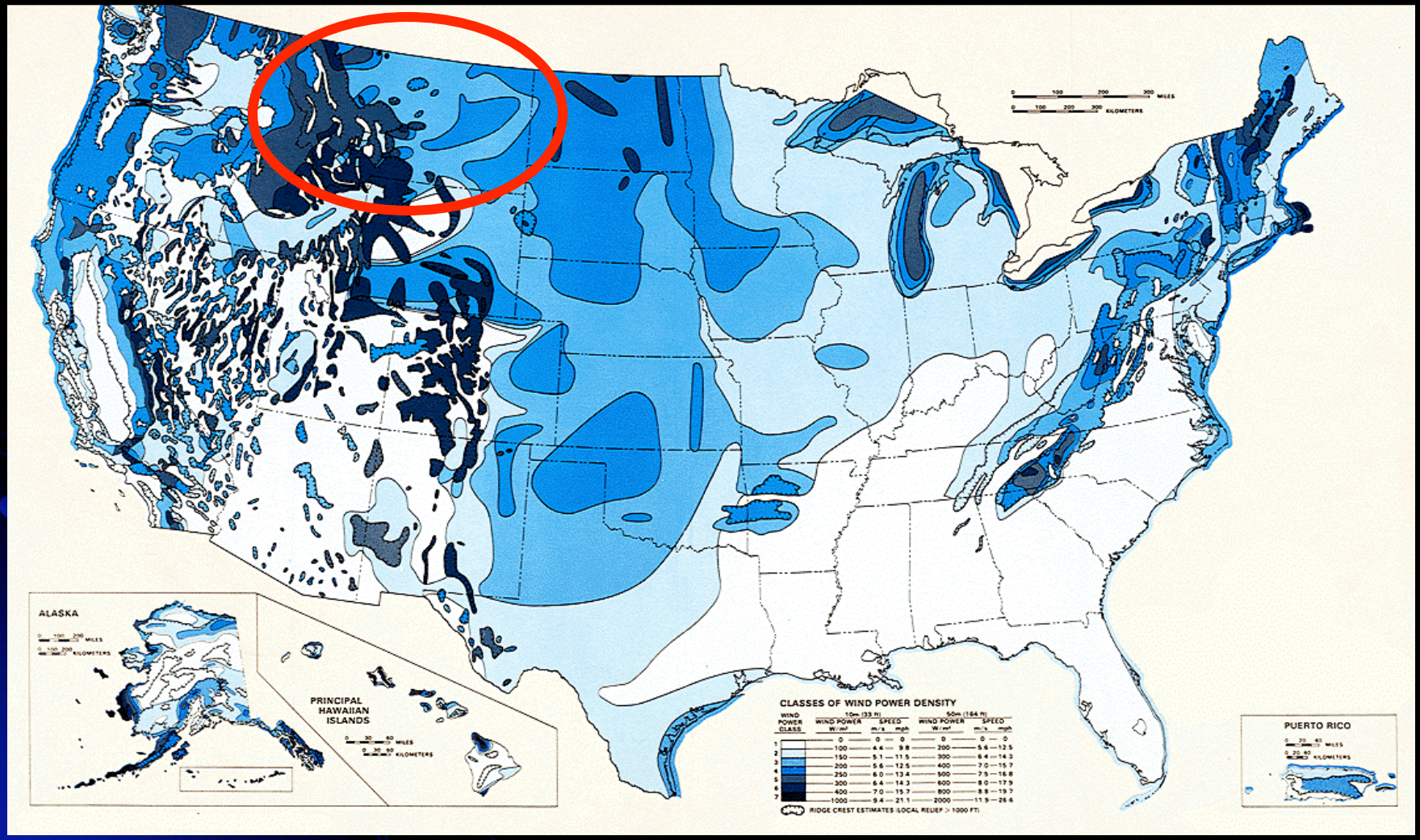
## "Clean & Green" Energy Development Incentives

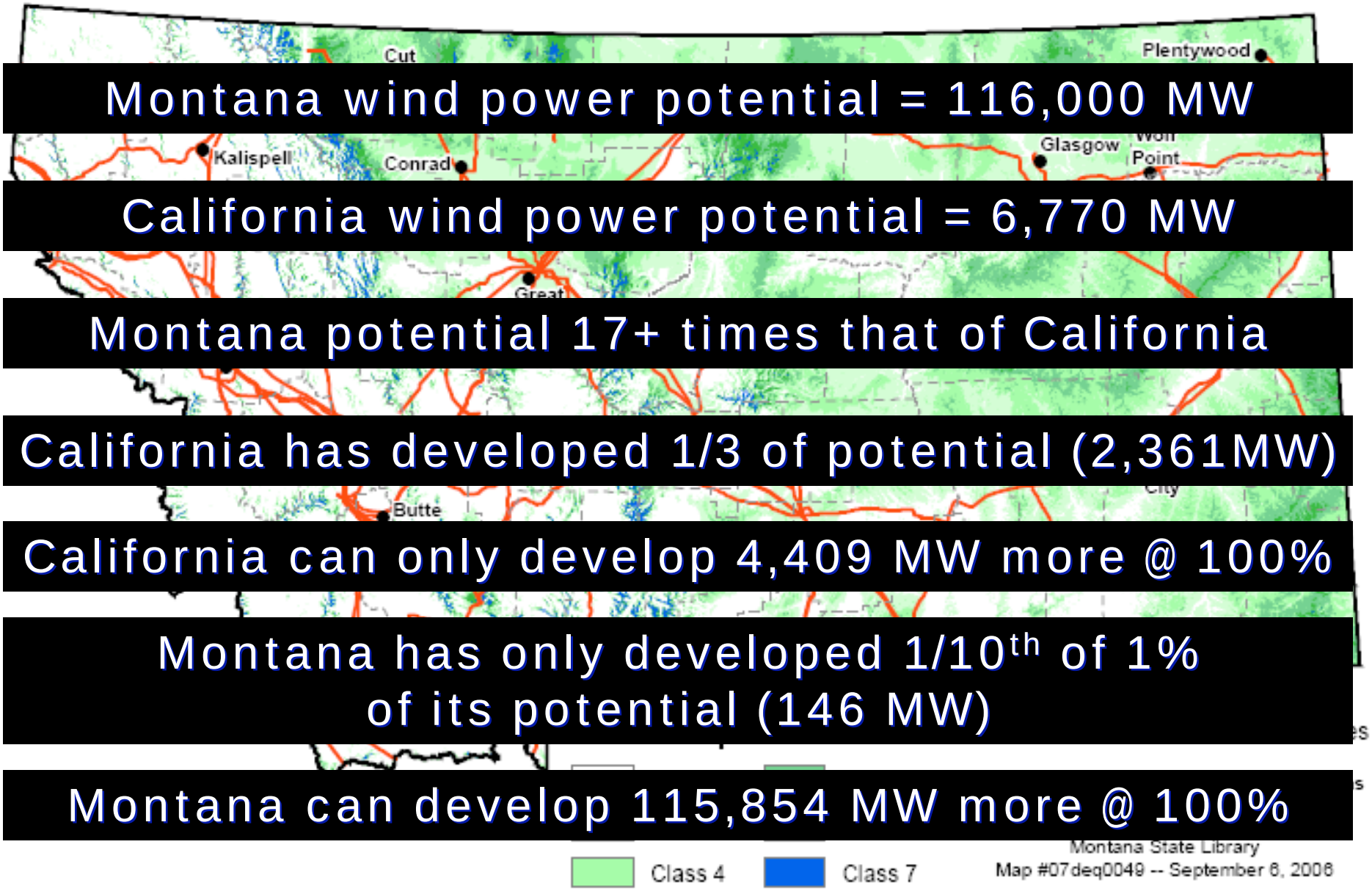
- Plants: "clean & green" CTL, CTG, IGCC, Biofuels, Geothermal; renewable energy manufacturing; R&D equipment -- 1.5% for 15-19 yrs (3% permanent)
- New "clean & green" transmission lines & pipelines – 12% to 3% (1.5% - 15-19 yrs)
- Thresholds: clean product ($CO_2$ capture & sequestration), new investment, prevailing wage rate

# We will develop all of these.


MONTANA IS
WIND
COUNTRY
MONTANA
BIG SKY COUNTRY
ROPING THE WIND FOR TODAY'S POWER AND TOMORROW'S ENERGY SOLUTION

# US Annual Average Wind Power






Montana wind power potential = 116,000 MW

California wind power potential = 6,770 MW

Montana potential 17+ times that of California

California has developed 1/3 of potential (2,361MW)

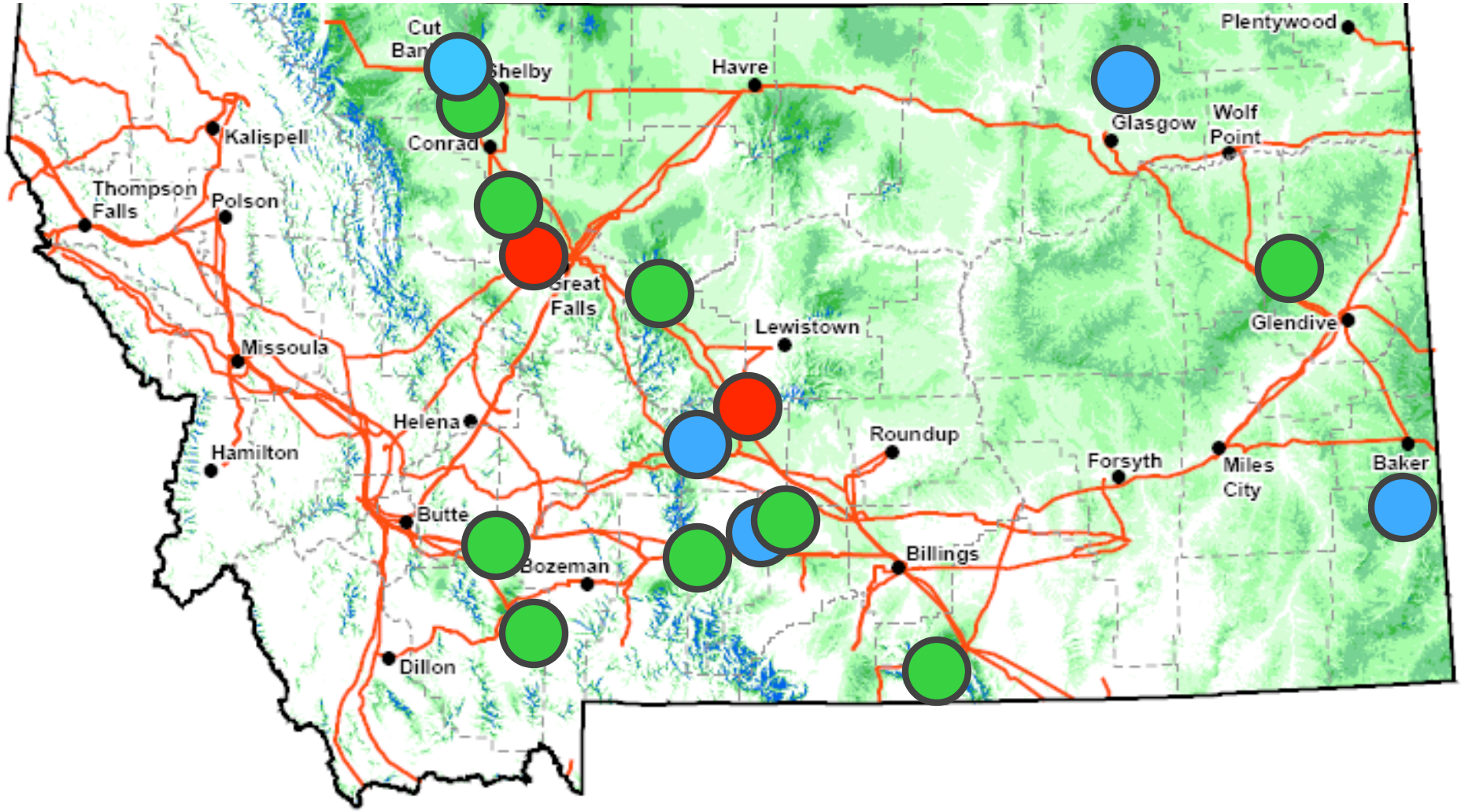
California can only develop 4,409 MW more @ 100%

Montana has only developed 1/10$^{th}$ of 1% of its potential (146 MW)

Montana can develop 115,854 MW more @ 100%

# Wind Speed Class at 50 Meters

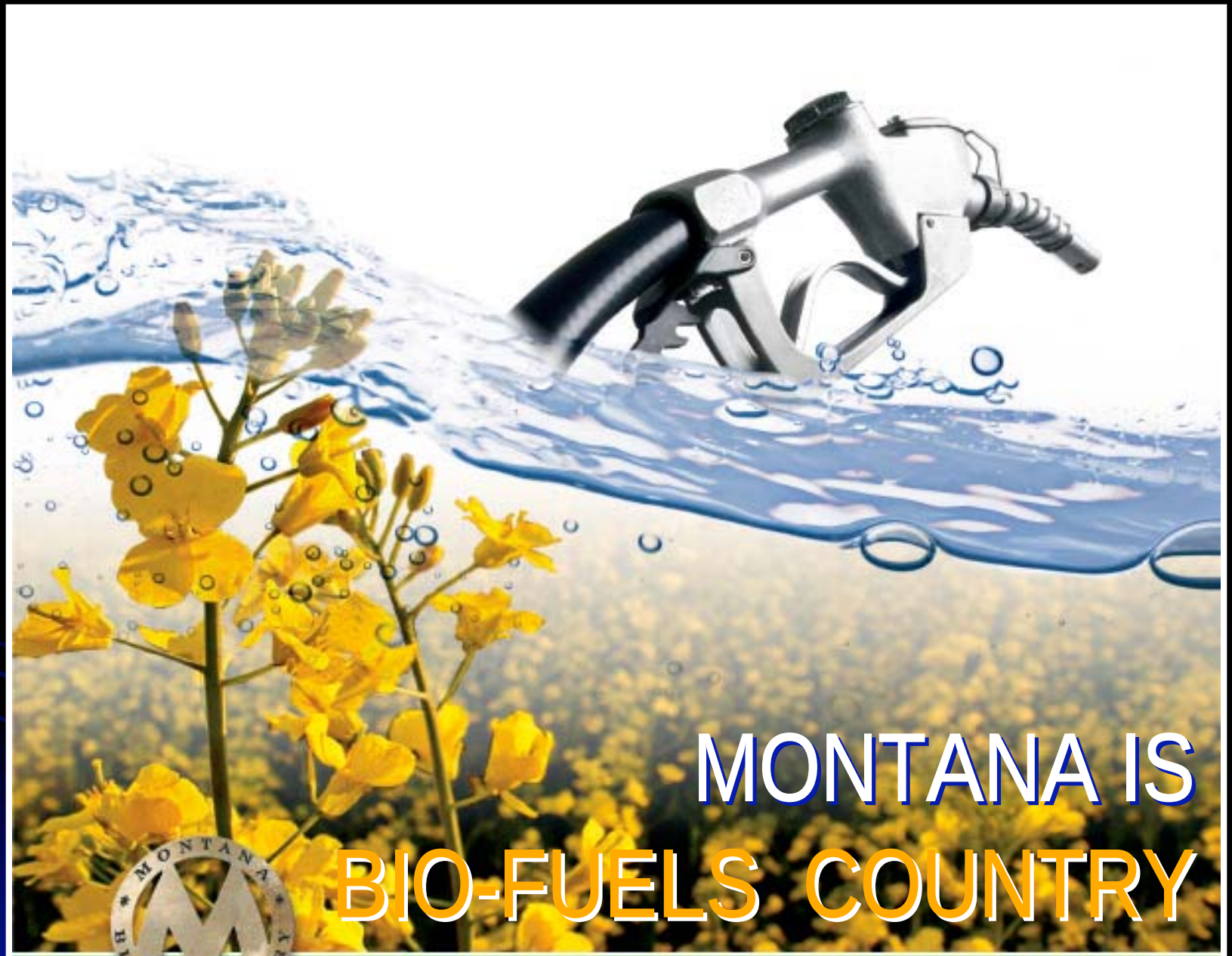
## WIND FARM ACTIVITY




EXISTING PROPOSED PLANNED

# Montana's Commitment to Wind Power Development

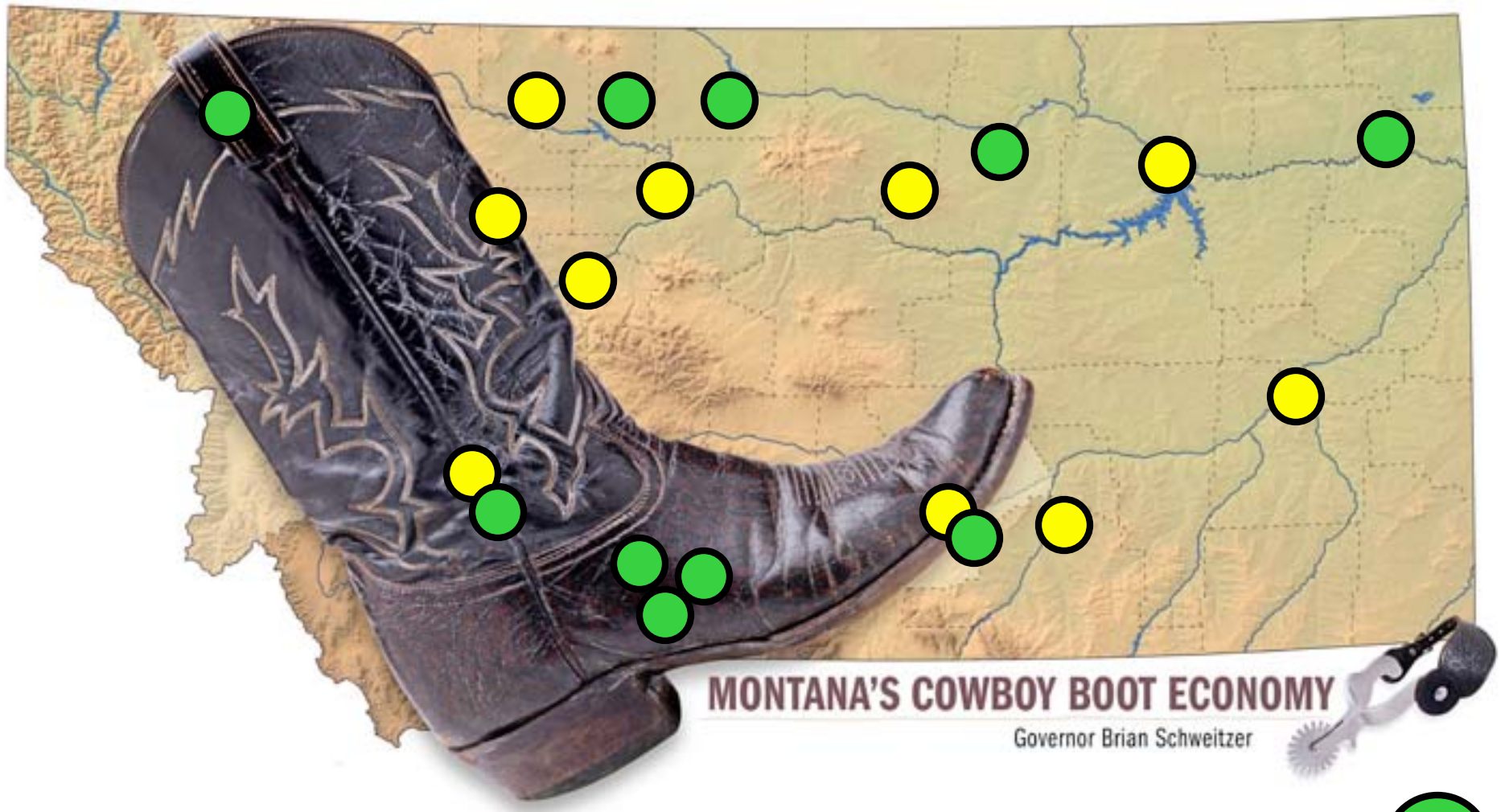
- Montana adopted a state renewable energy portfolio standard in 2005 requiring 15% renewable power by 2015
- Montana has seven (7) tax incentives for the development of wind power
- Sen. Baucus passes Clean & Renewable Energy Bonds (CREBs) incentive for local & tribal government wind power


MONTANA IS
BIO-FUELS COUNTRY
MONTANA
BIG SKY COUNTRY
DEVELOPING BIOMASS FUELS FOR TOMORROW'S ENERGY

# Montana's Assets for Bio-Fuels Development

- Total land area of 145,000 sq. mi. – 4th largest state
- 16.5 million acres of crop land suitable for growing grain and/or seed crops for use in ethanol & bio-diesel
- 19 million acres of non-reserved forest land available for ethanol from bio-mass

Proposed Ethanol Plants




Proposed Bio-Diesel Plants

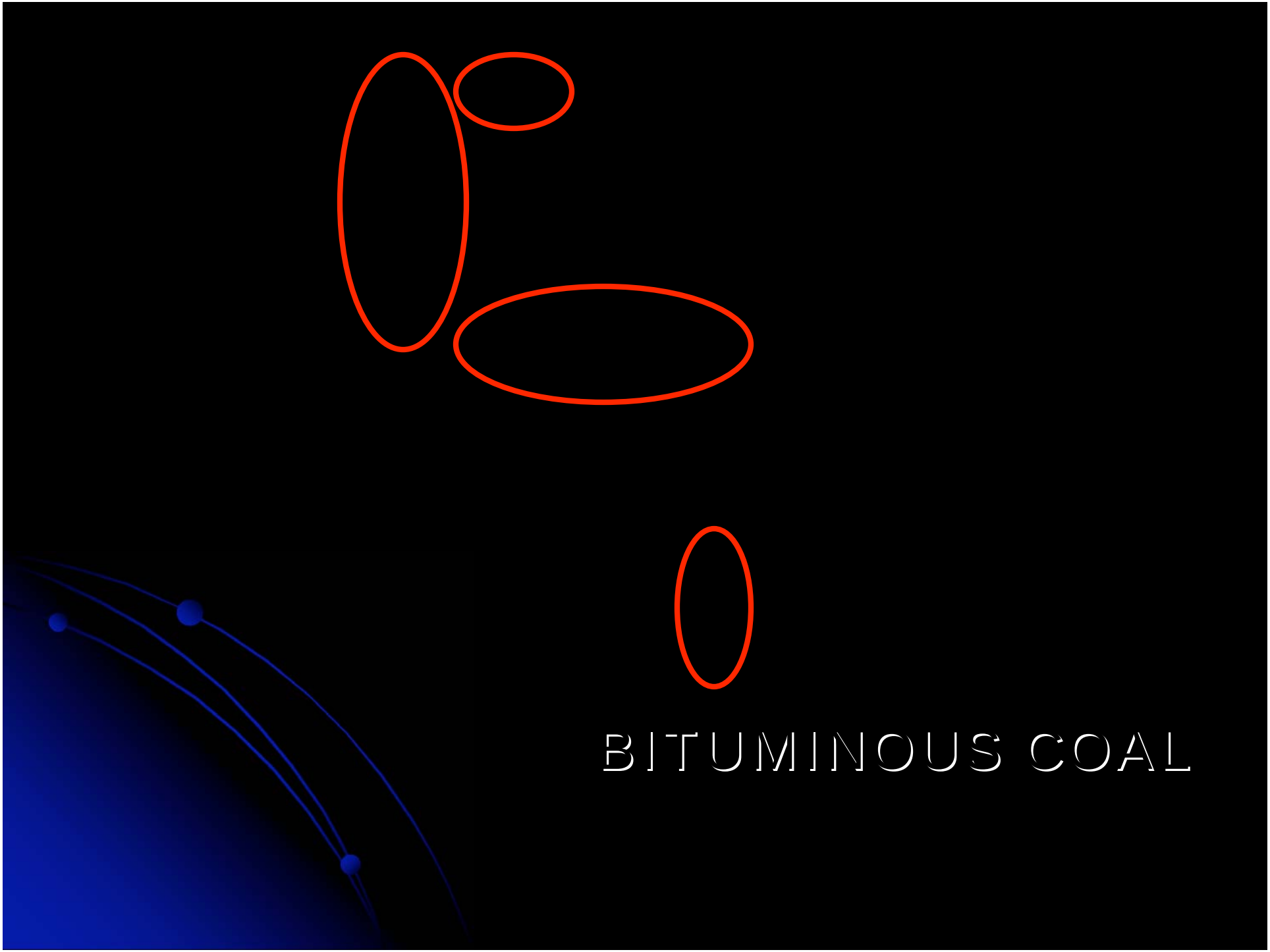

MONTANA IS
COAL COUNTRY
Turning our coal advantage into jobs & growth

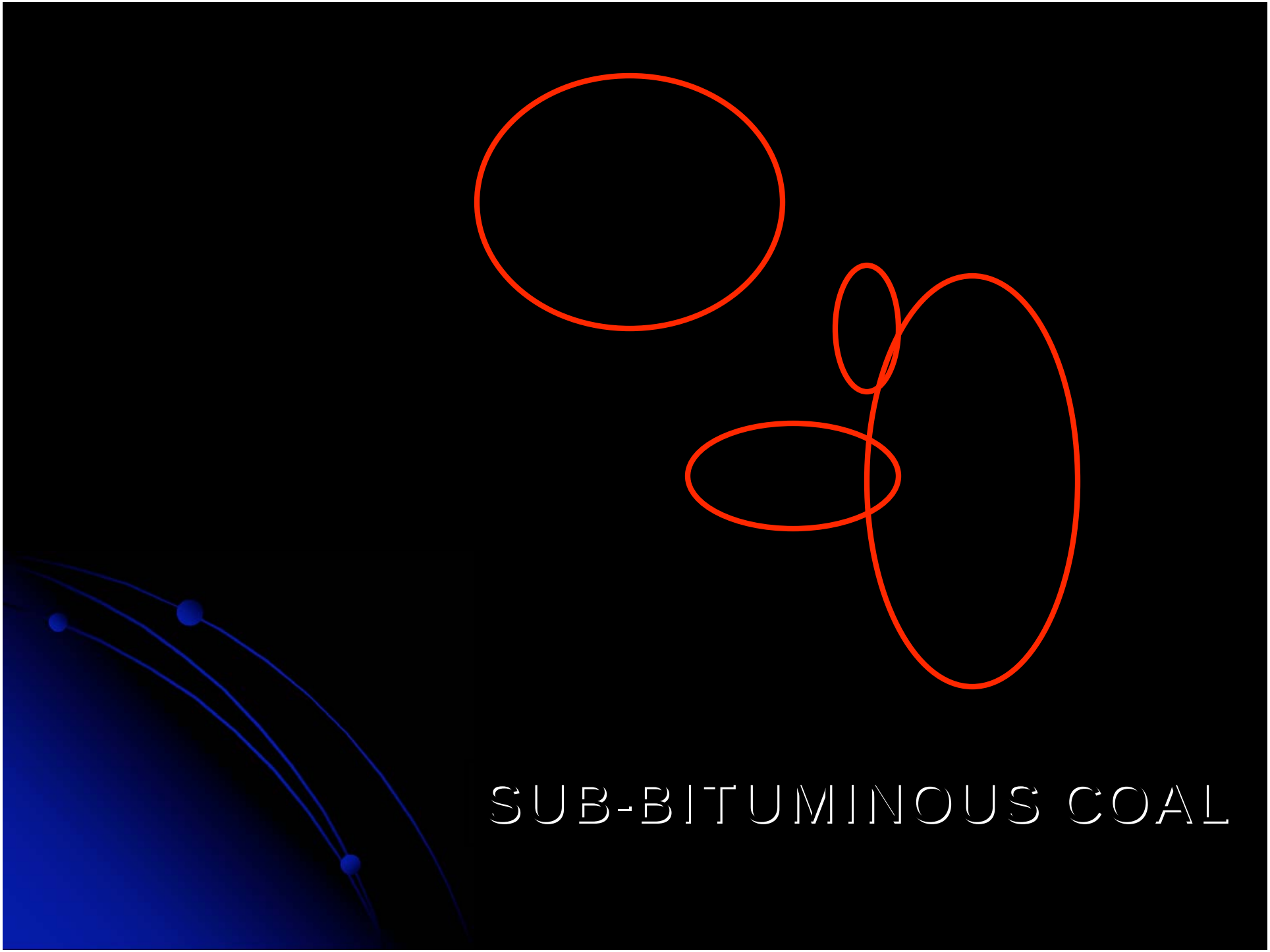
# Montana Coal Reserves

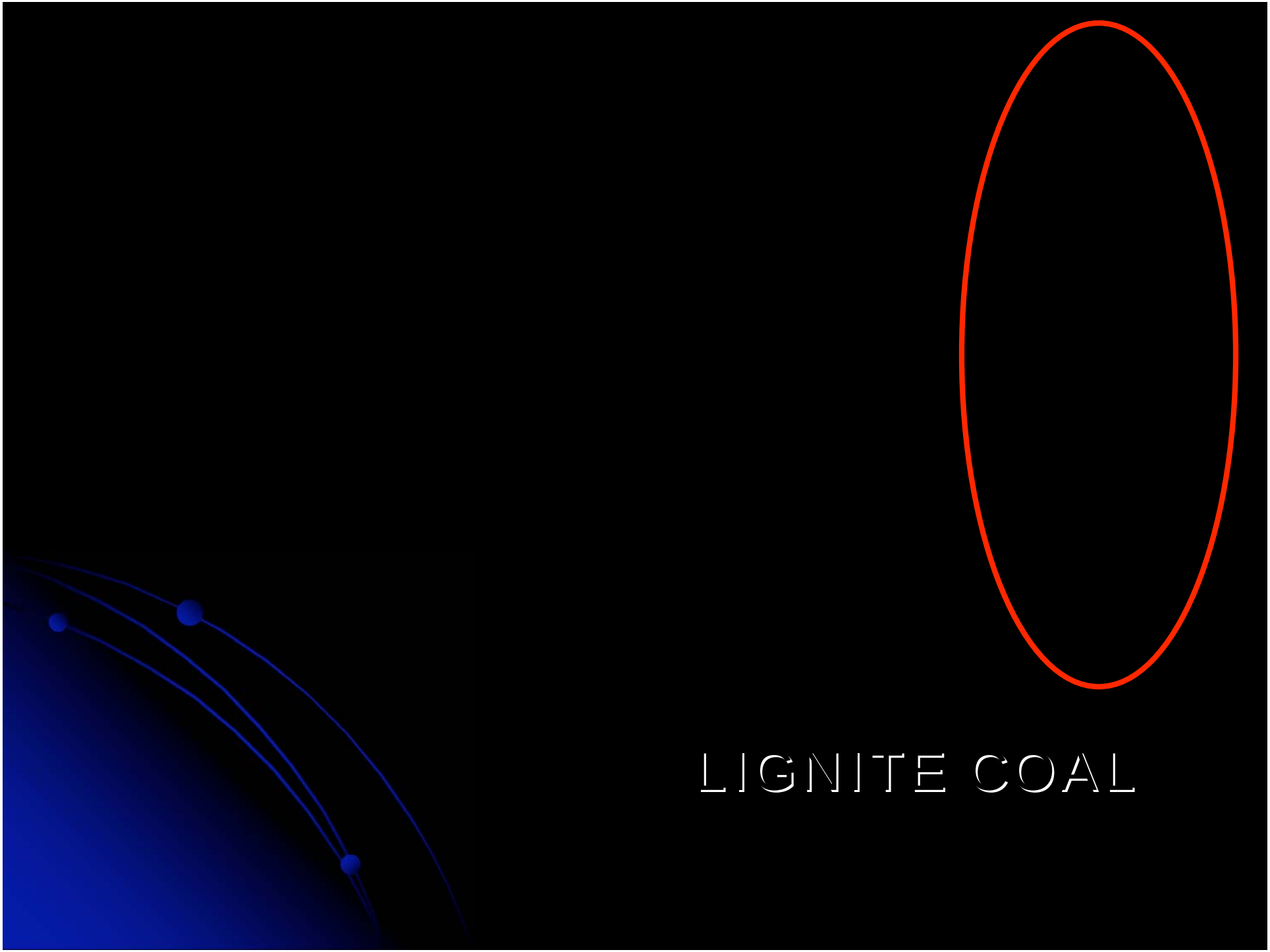
120 Billion Tons

28% Nation's Coal

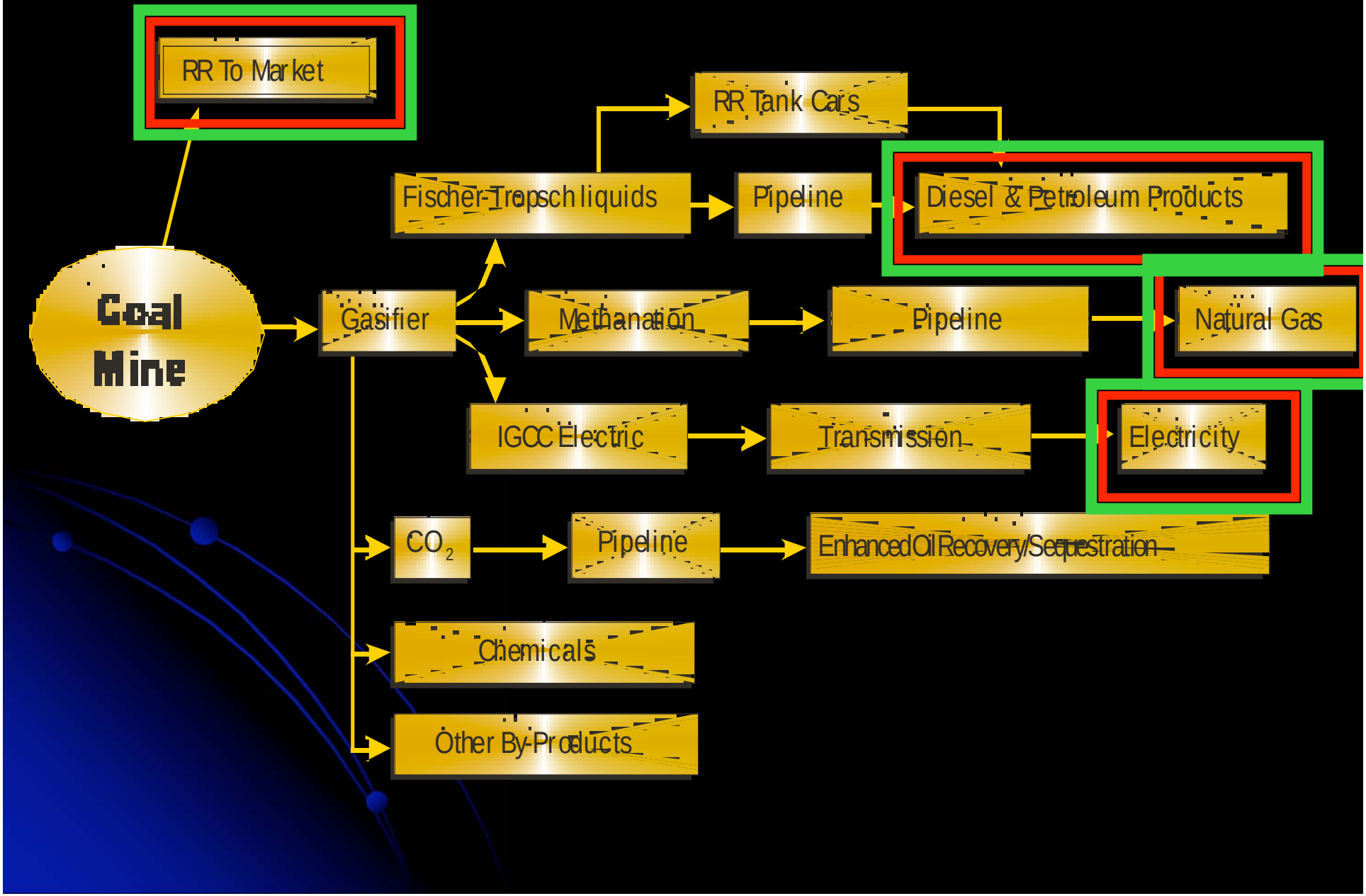
8% World's Coal


BITUMINOUS COAL


SUB-BITUMINOUS COAL


LIGNITE COAL

# Coal Market Options



# Coal Mining & Shipping

# Coal to SNG

# Coal Gasification Major Processes

## Gasification Technologies

GE

Lurgi

Shell

KBR

Future Energy

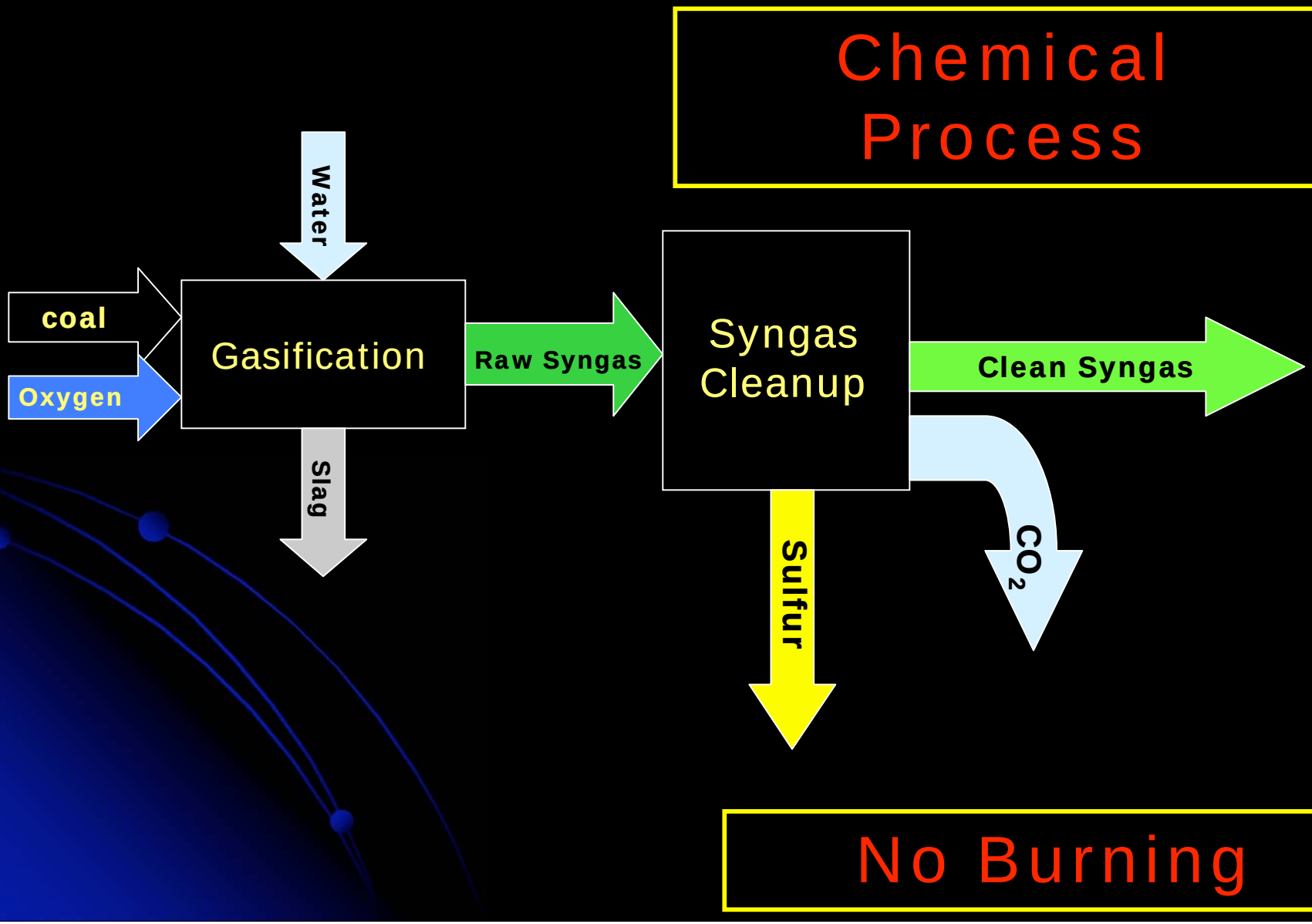
Conoco-Phillips

Alchemix

Proven Technology

Over 100 in Use

# Coal Gasification to Syngas



# Coal-to-Liquids

"CTL"

# Coal Liquefaction Major Processes

## Liquefaction Technologies

Sasol

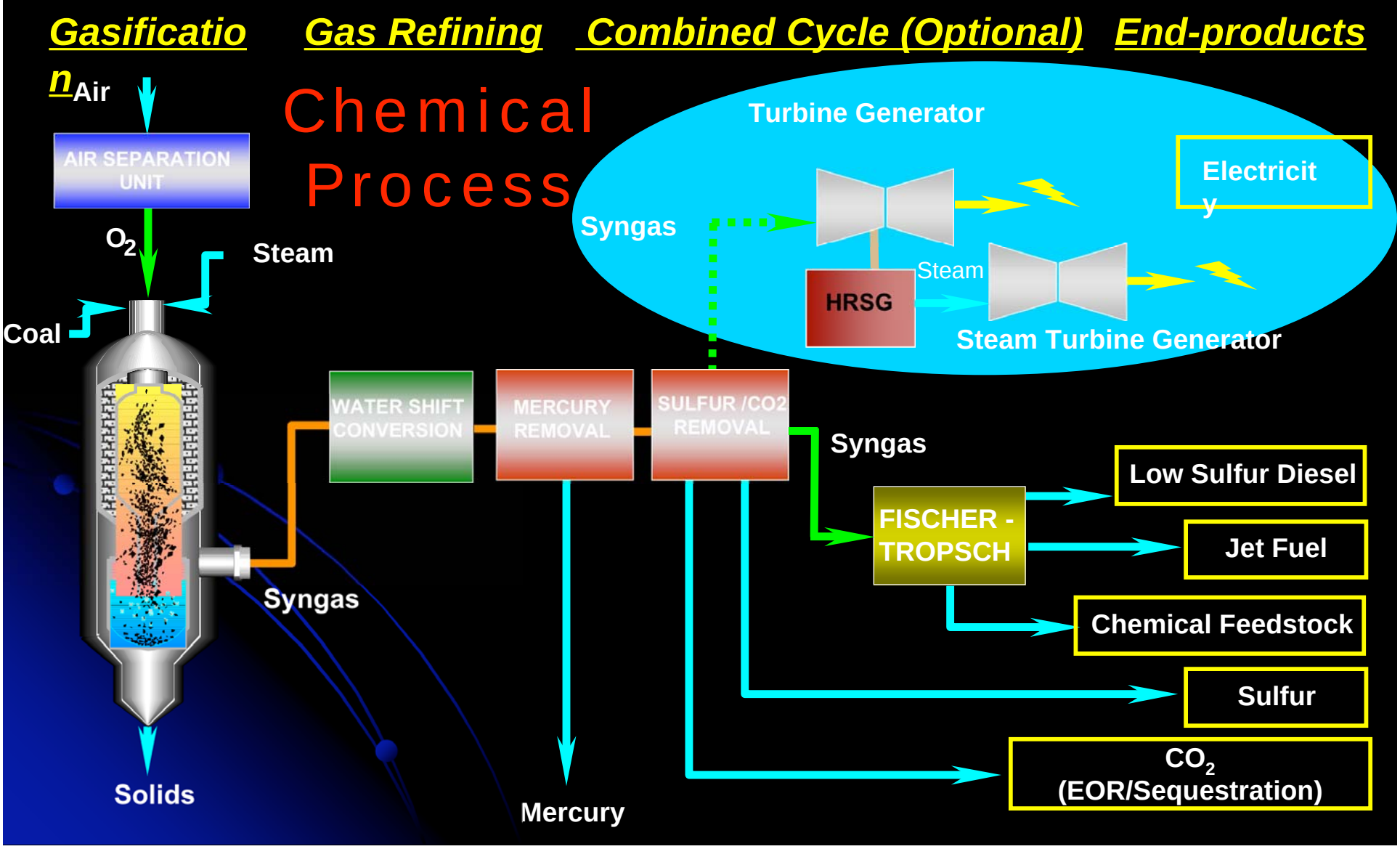
Lurgi

GE

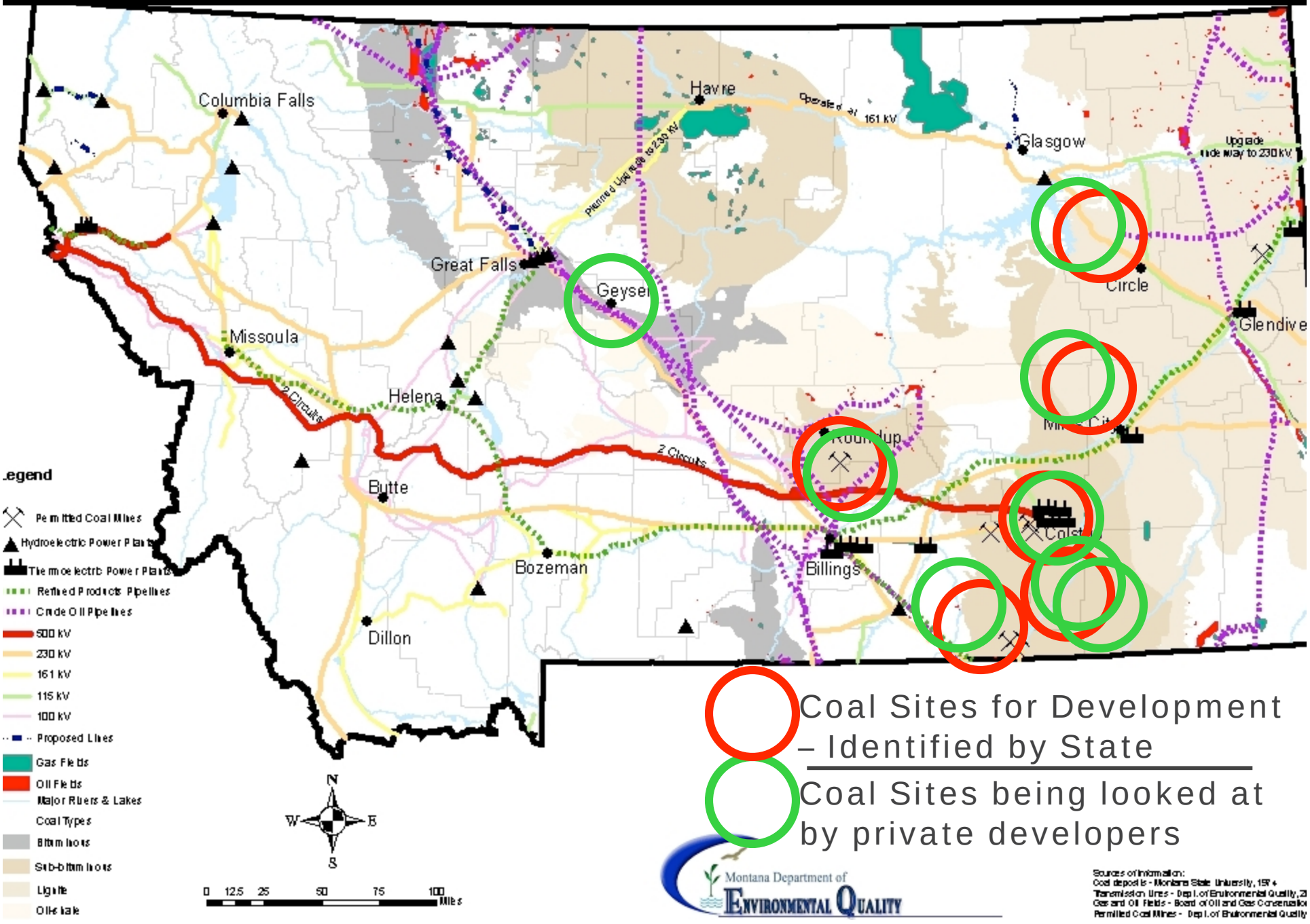
Rentech

Syntroleum

# Coal-To-Liquids ("CTL") with $CO_2$ Capture & Storage



# Some Montana Coal Sites for Development



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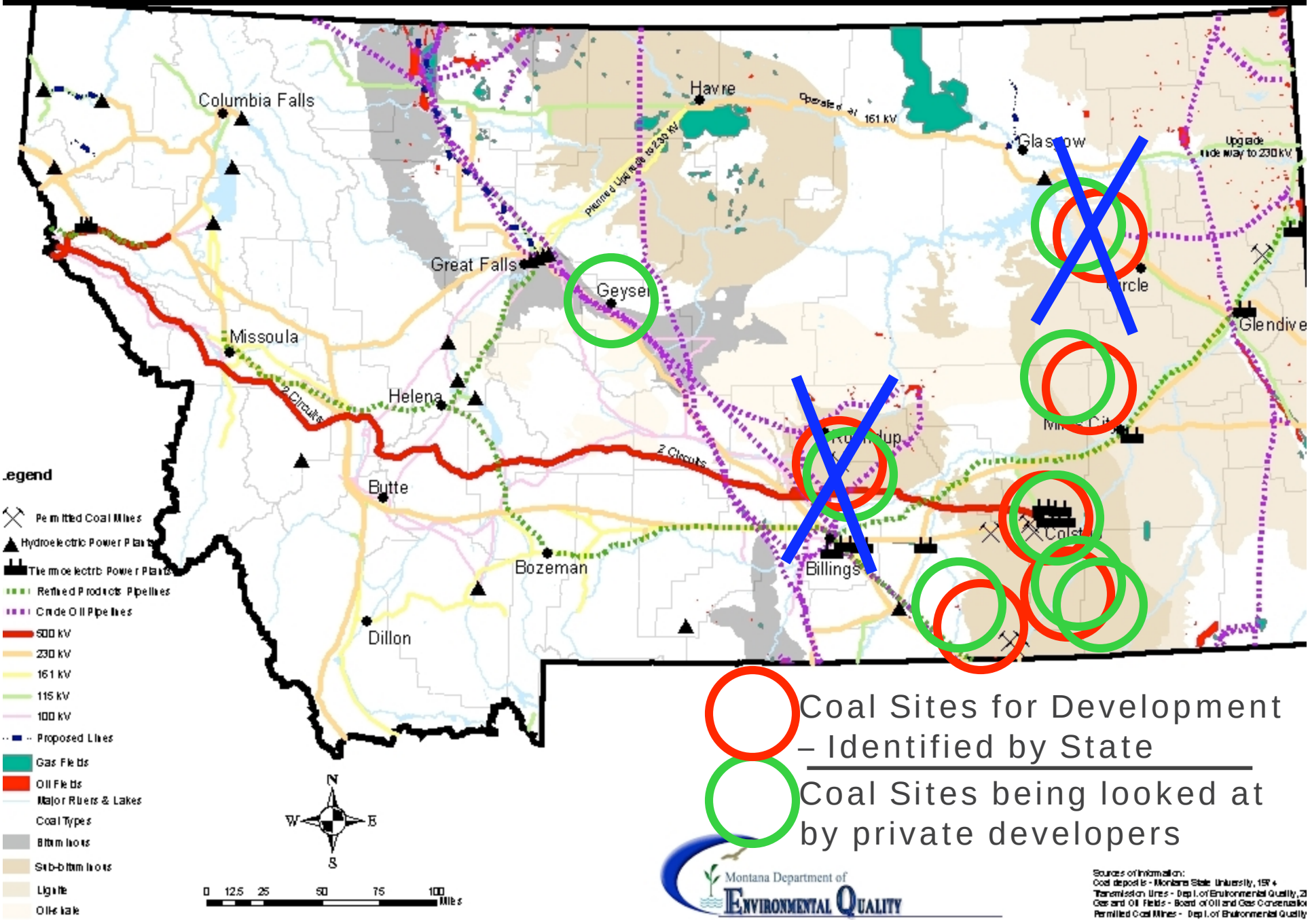



Coal Sites for Development – Identified by State

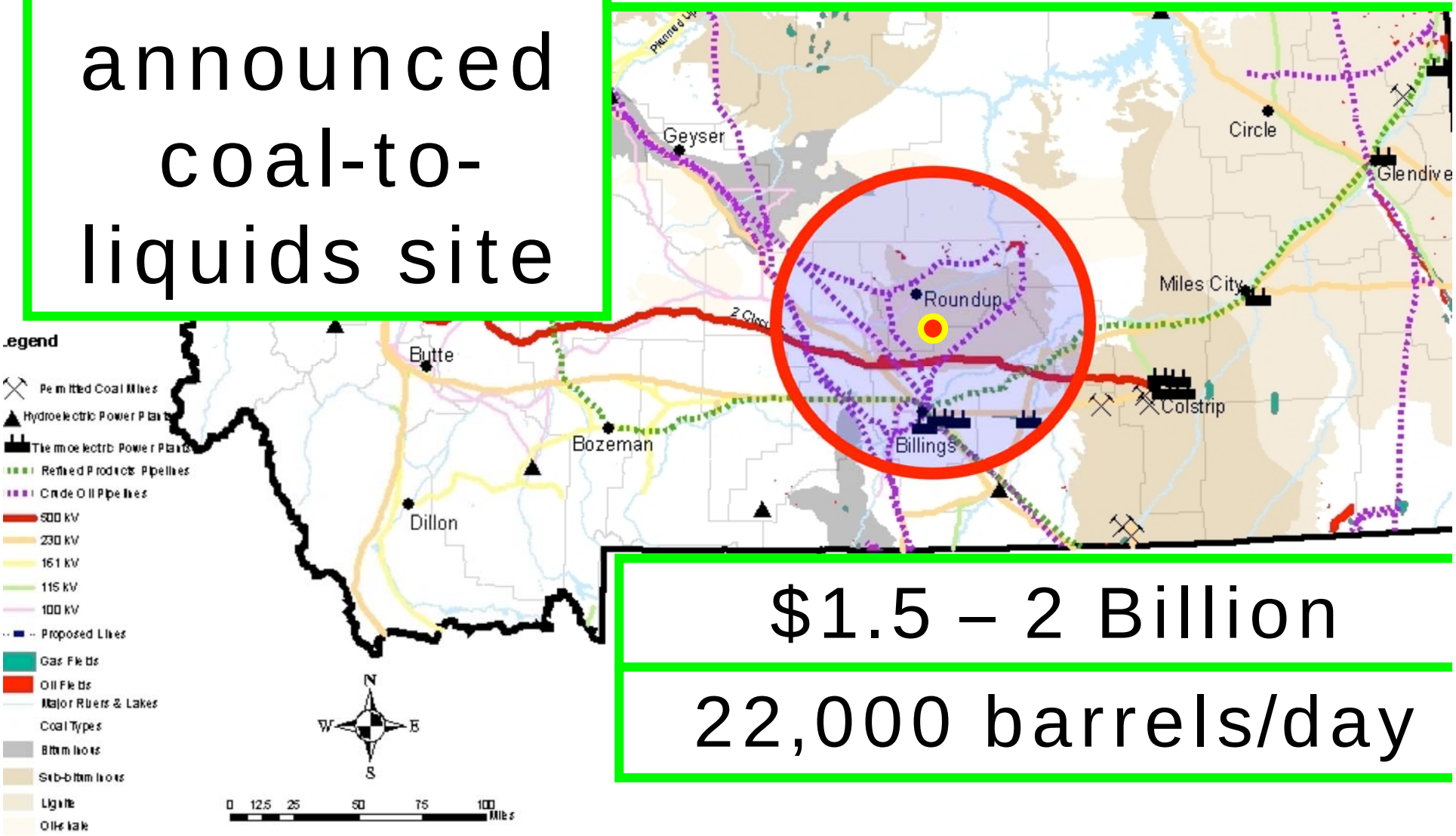
Coal Sites being looked at by private developers

Montana Department of Environmental Quality

Sources of Information:
Coal deposits - Montana State University, 1974
Transmission Lines - Dept. of Environmental Quality, 2
Gas and Oil Fields - Board of Oil and Gas Conservatio
Permitted Coal Mines - Dept. of Environmental Quality

# Montana's first announced coal-to-liquids site

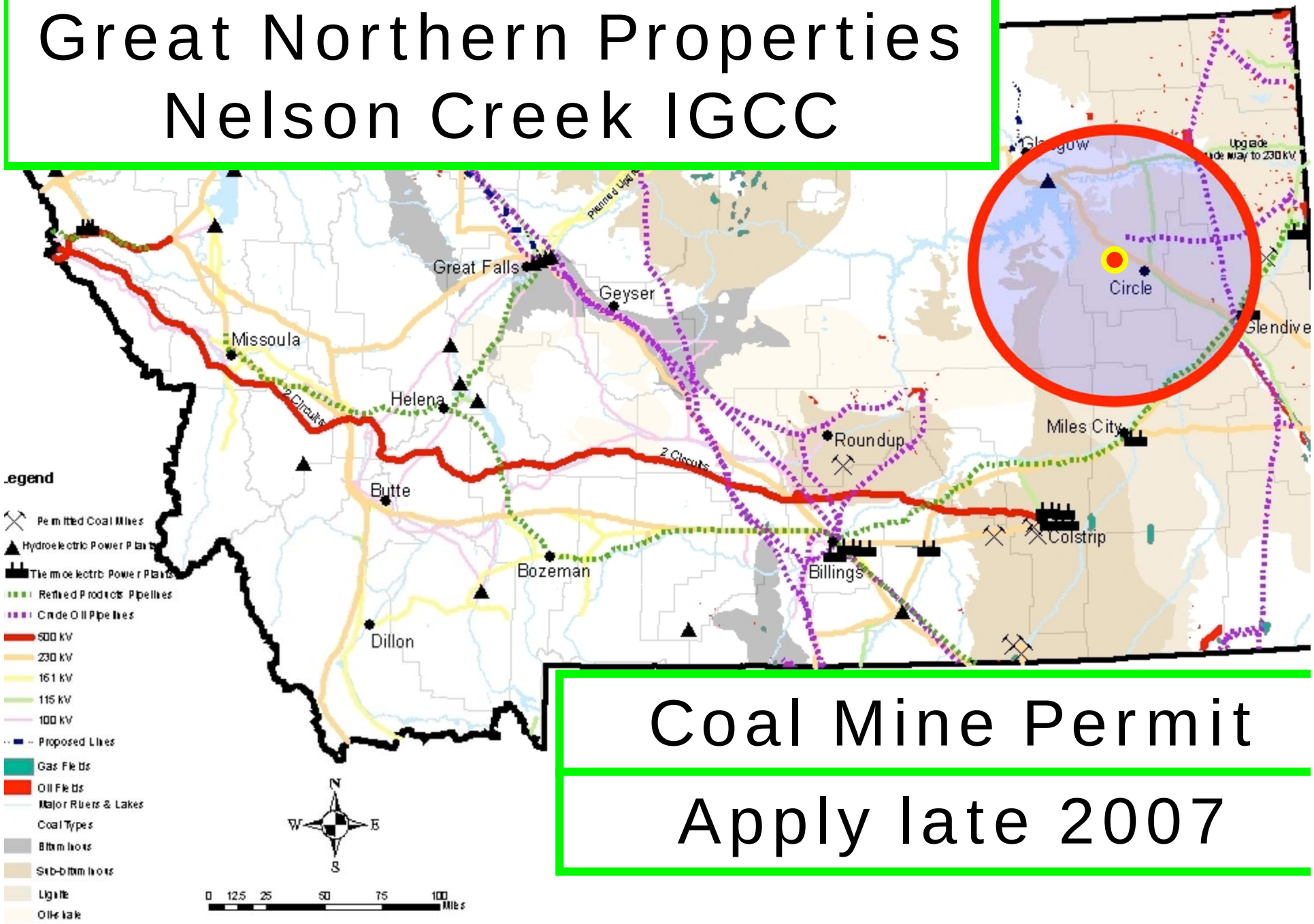
# DKRW/Arch Coal - Bull Mountain Coal




## $1.5 – 2 Billion

## 22,000 barrels/day

# Great Northern Properties
# Nelson Creek IGCC




## Coal Mine Permit

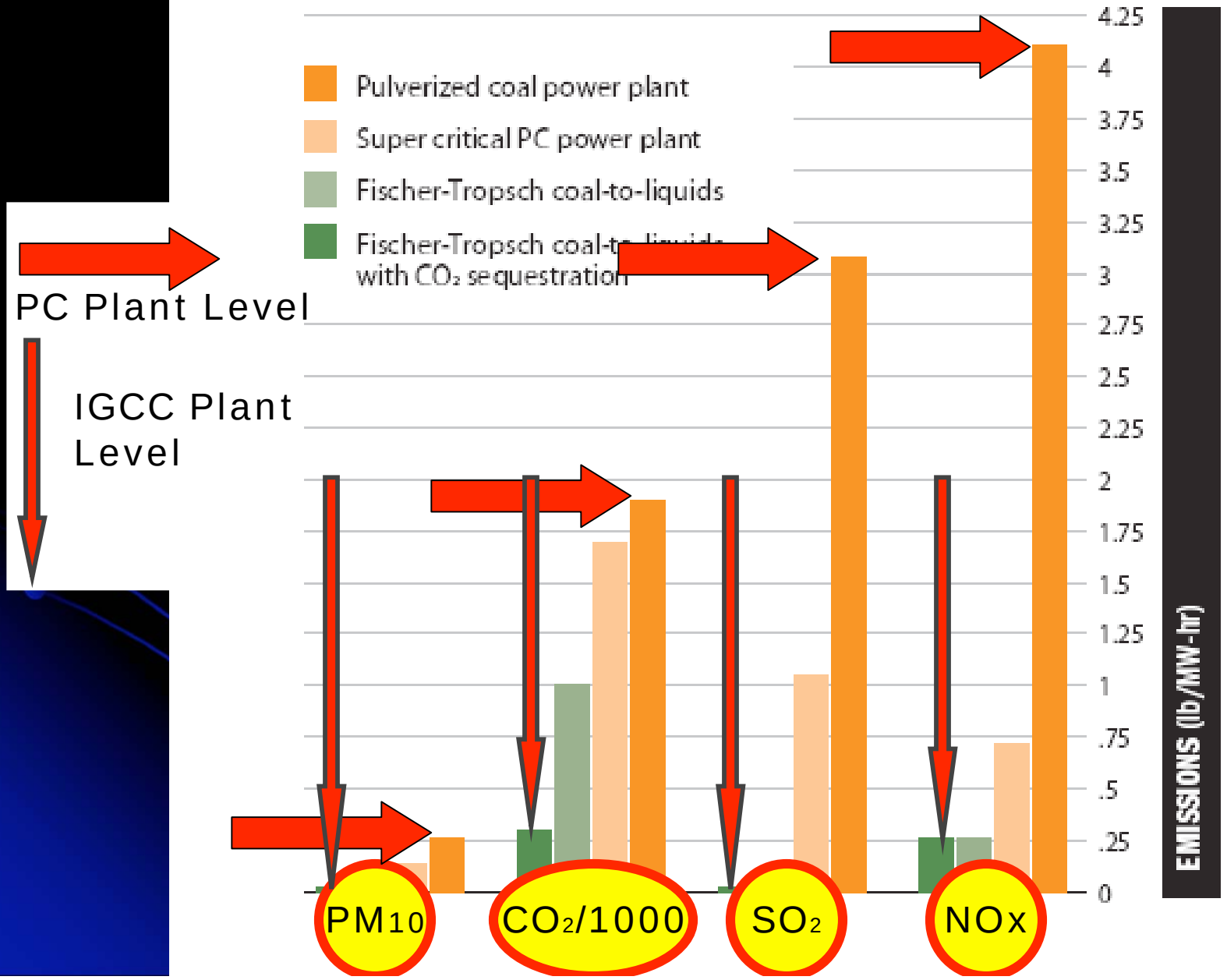
## Apply late 2007

# Coal-to-Liquid Plant Economic Viability

Can profitably produce diesel as long as oil stays above $35-40/barrel

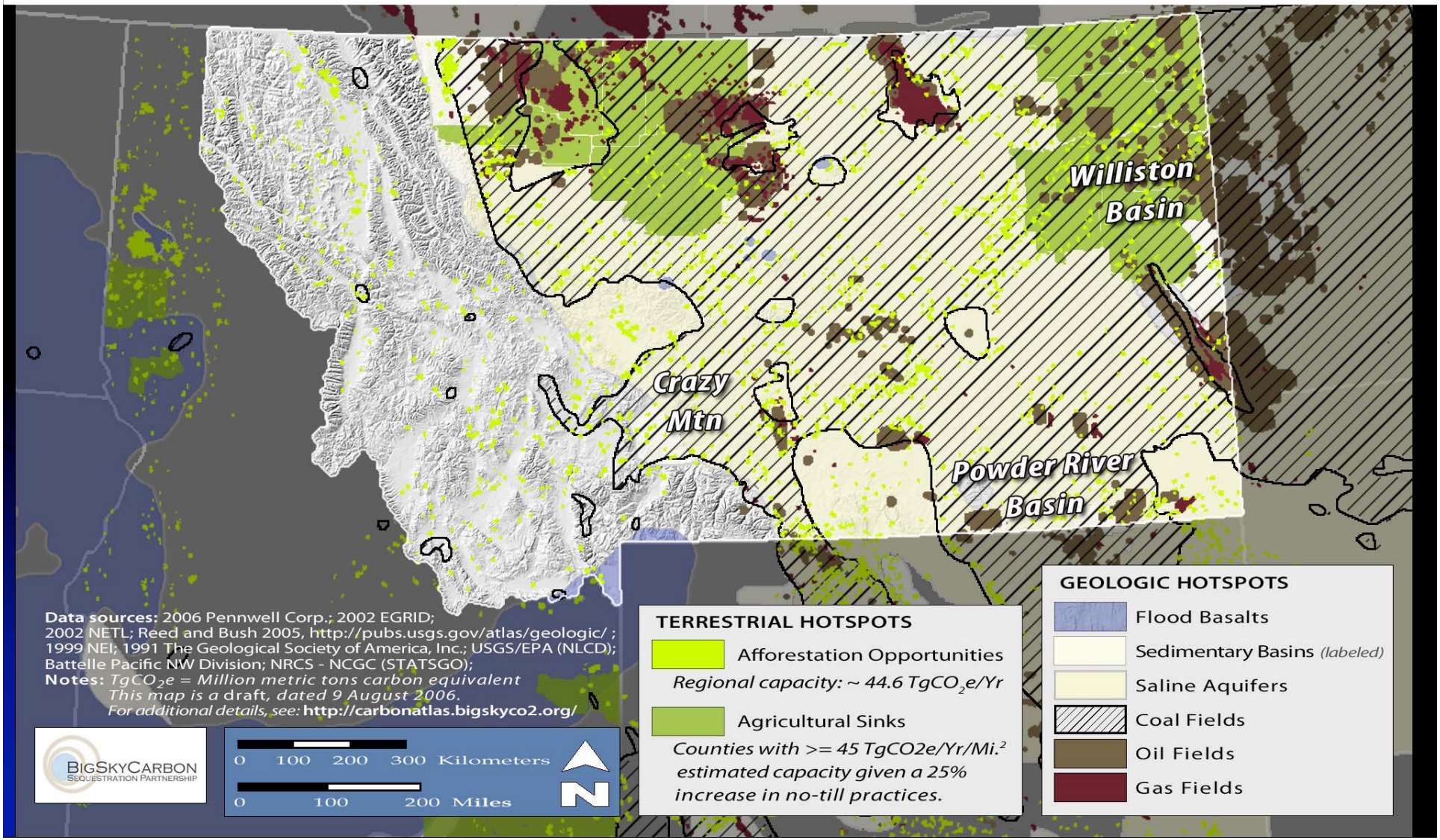
# Emissions Comparison of F-T Fuels Plants with 535MW Power Plants

(national figures, Rentech)



# Carbon Capture & Sequestration

# Hotspots for $CO_2$ Sequestration in Montana



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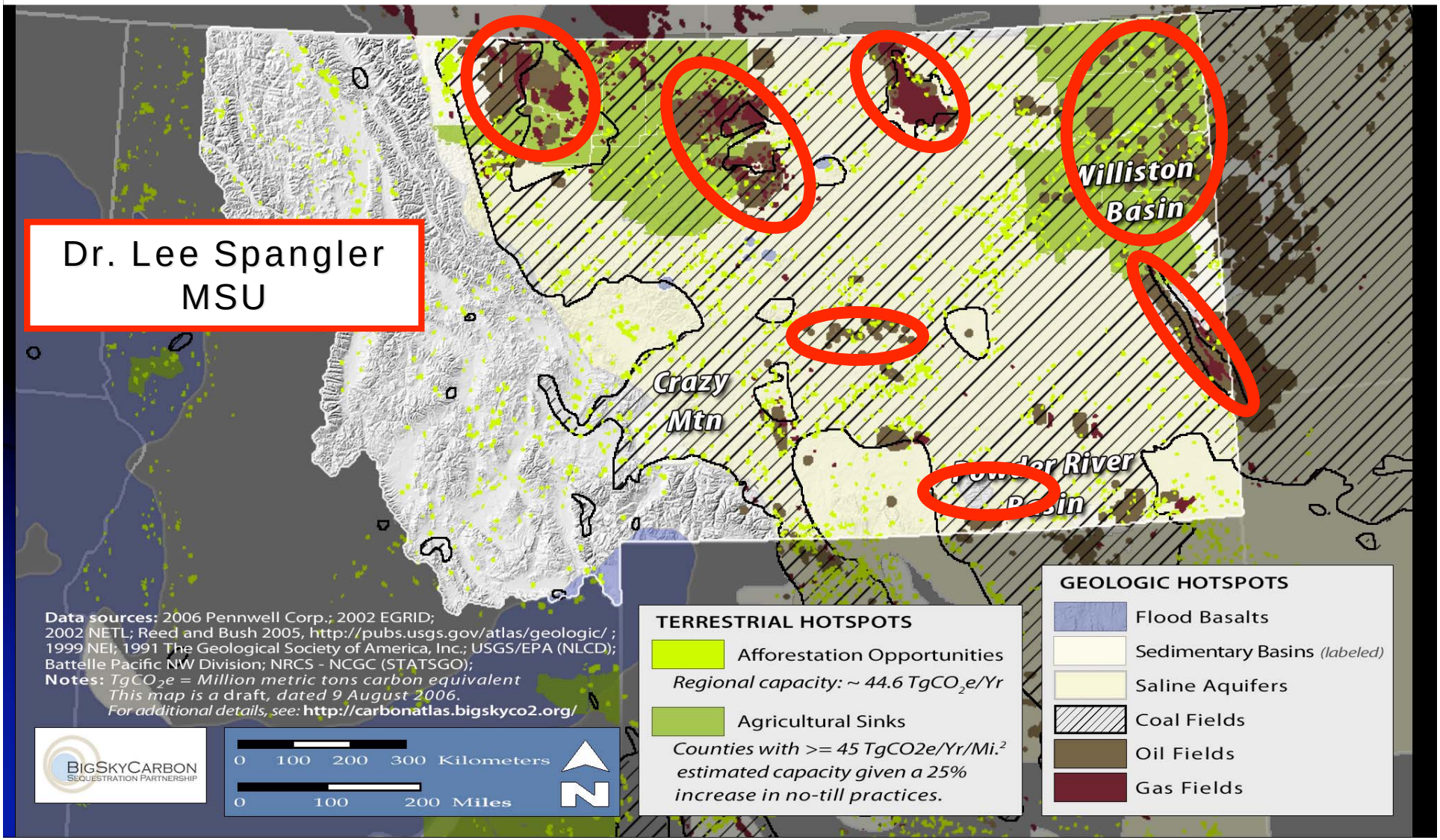
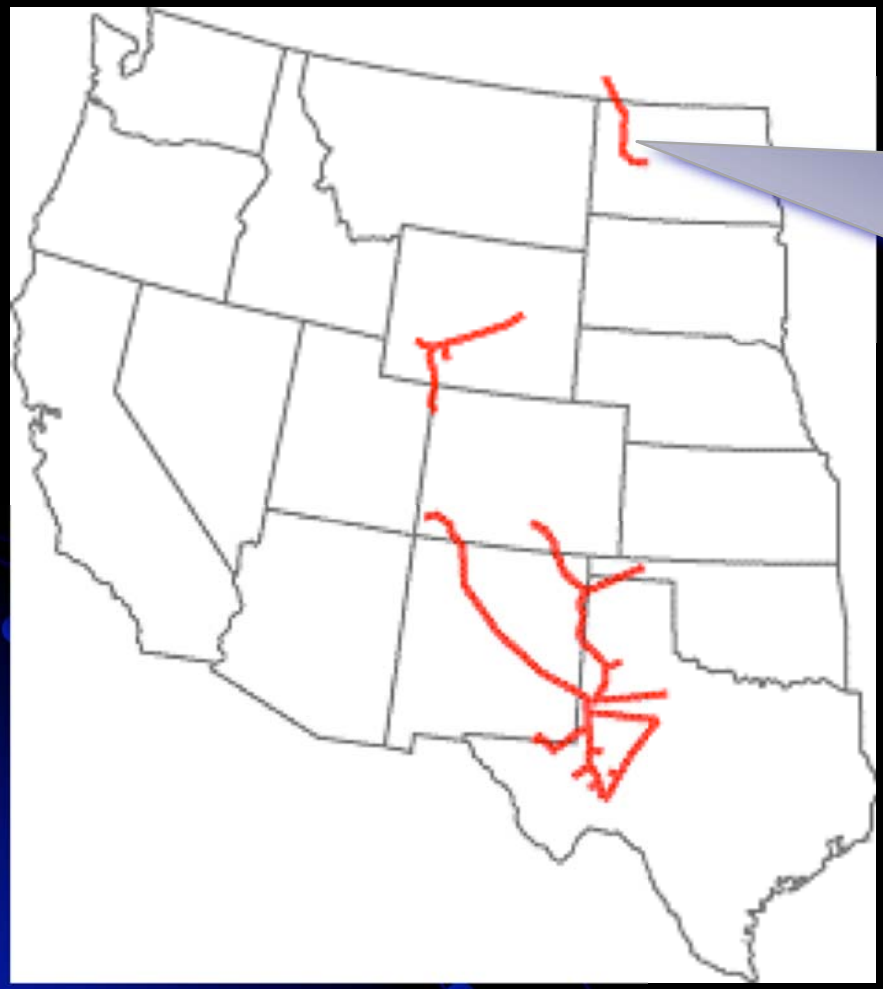
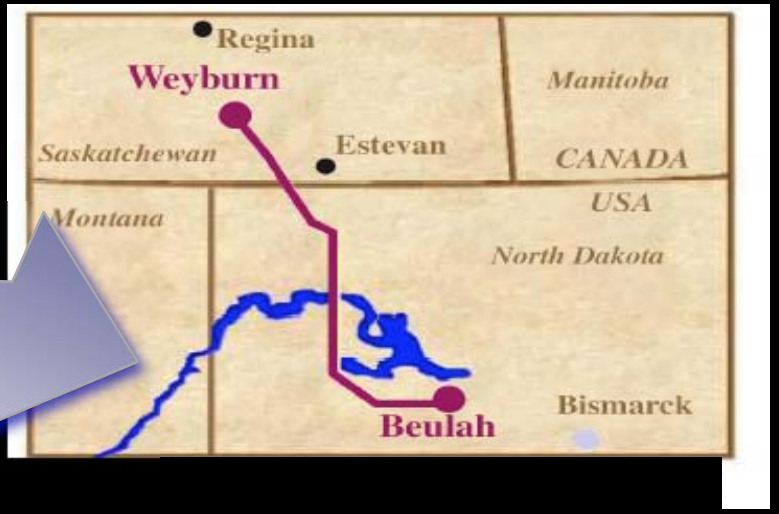


# E.O.R. Carbon Sequestration

## Canada-USA Project



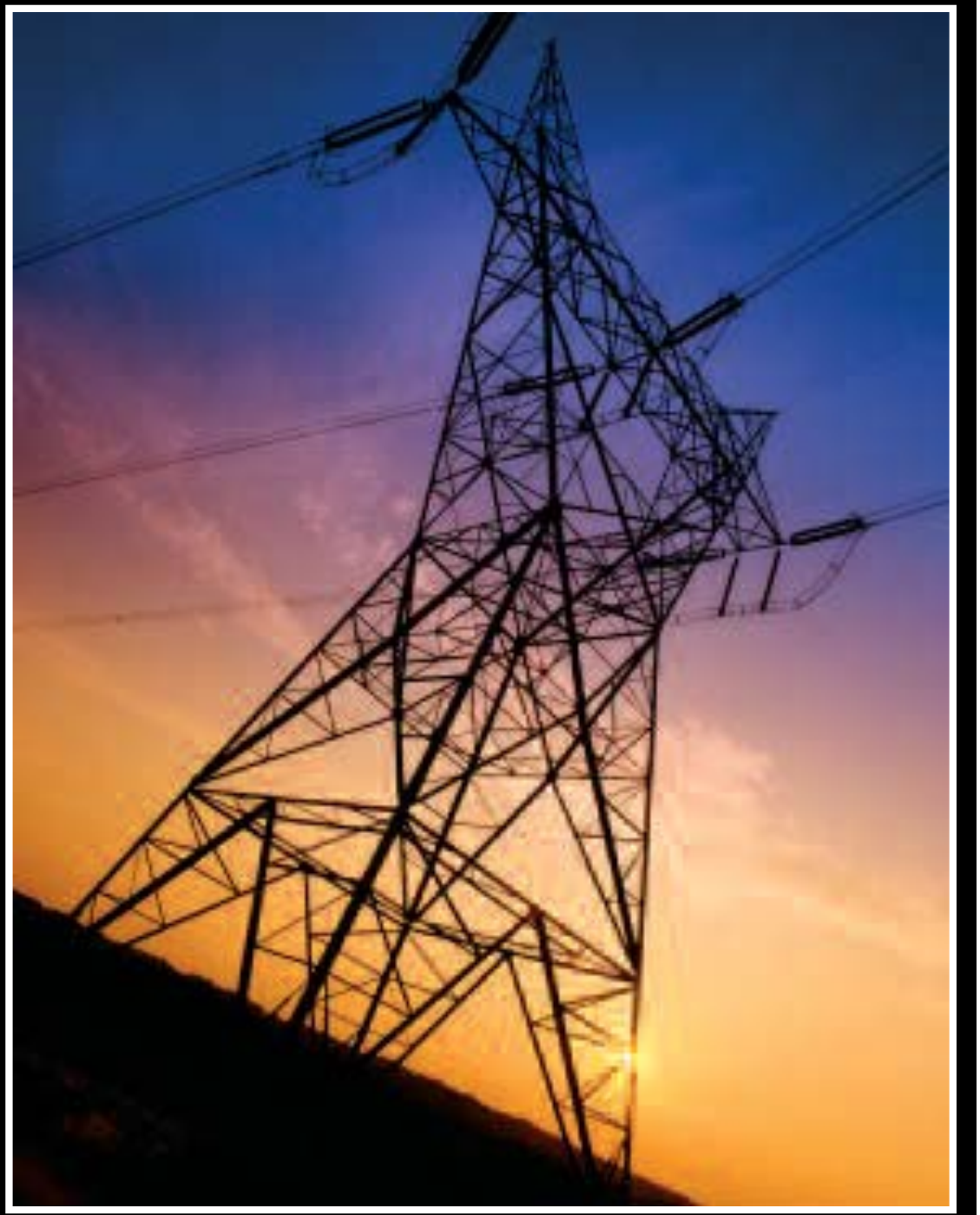



Pipeline Route from Great Plains Gasification Plant to Weyburn Oil Field

- 5,000 tons / day $CO_2$
- 204-mile $CO_2$ pipeline from Gasification Plant
- 130M barrels oil over 20-year project [EOR]
- 1M tons / year $CO_2$ sequestered

Source: Carl Bauer, NETL, DOE, 10-18-05

# Coal to Electricity



Why are we pushing "green power" (clean coal and wind) development?

# Montana is ...

... the 800# Gorilla when it comes to domestic coal supply !

When it comes to energy consumption...

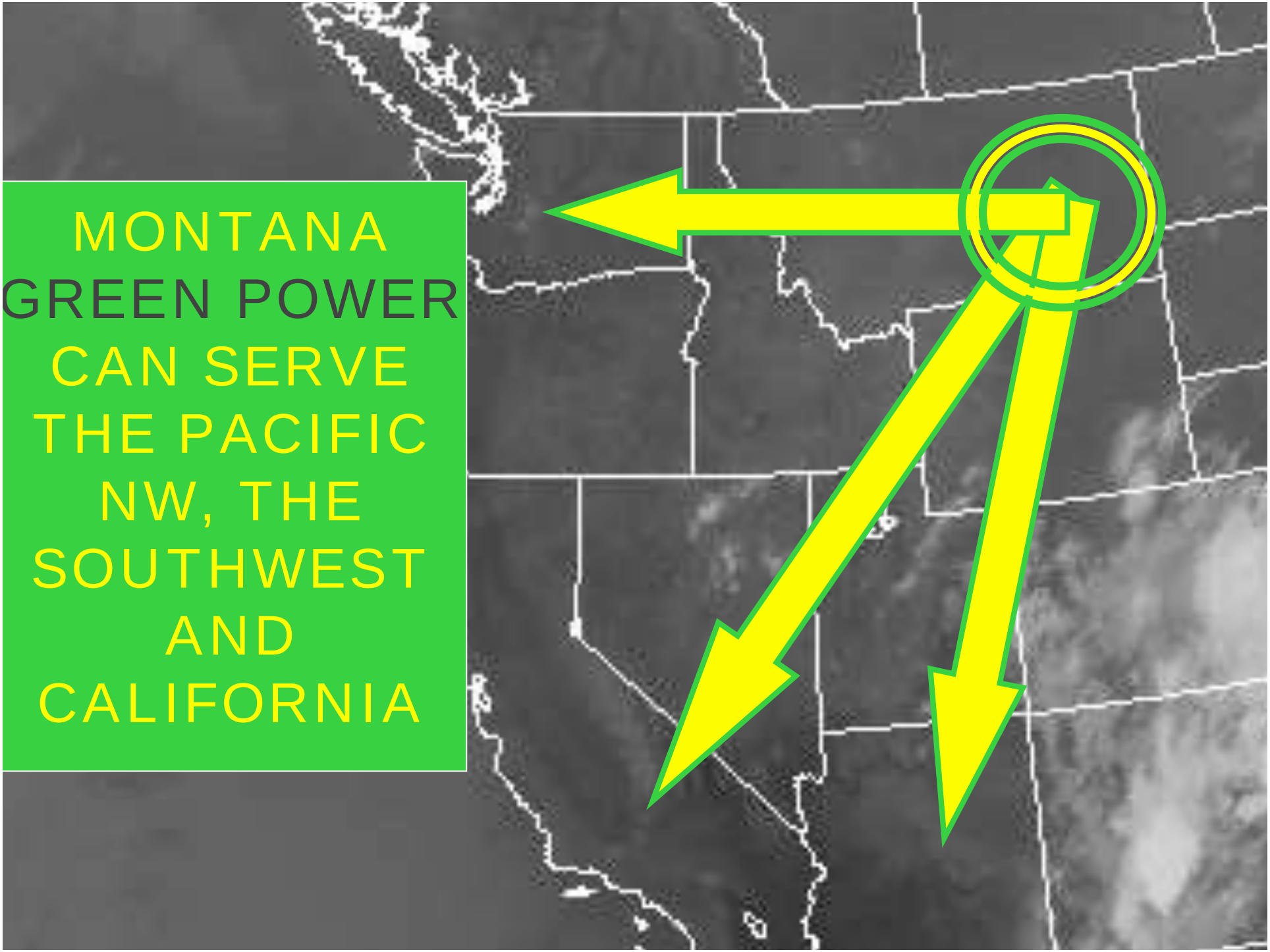
... California is the 800# Gorilla!

# CA legally demands any electric power imported into the state must ...

... meet IGCC standards -- greatly reduced emissions with capture of greenhouse gases.

... include 20% of green power in the portfolio mix by 2010

... 33% by 2020


MONTANA
GREEN POWER
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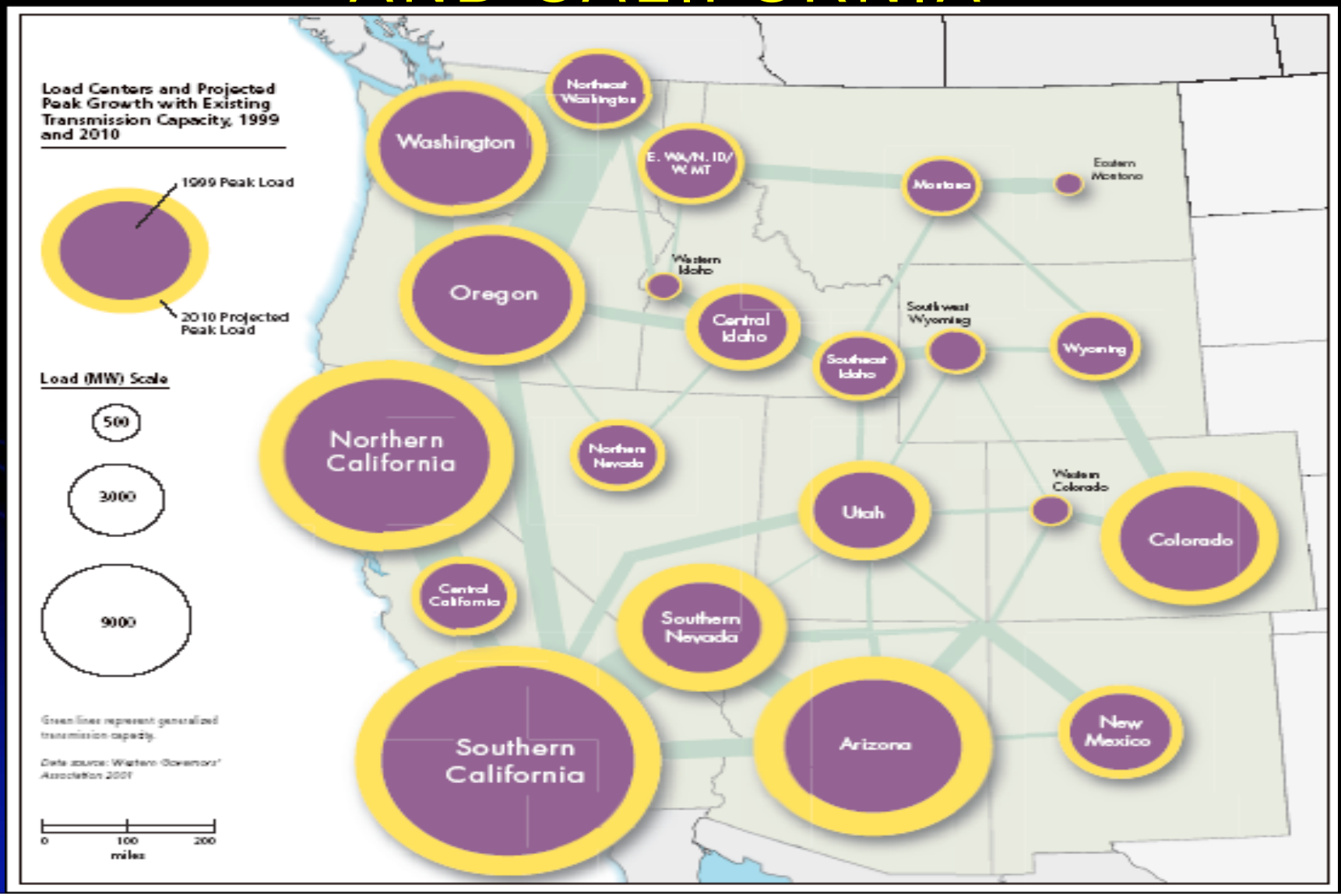

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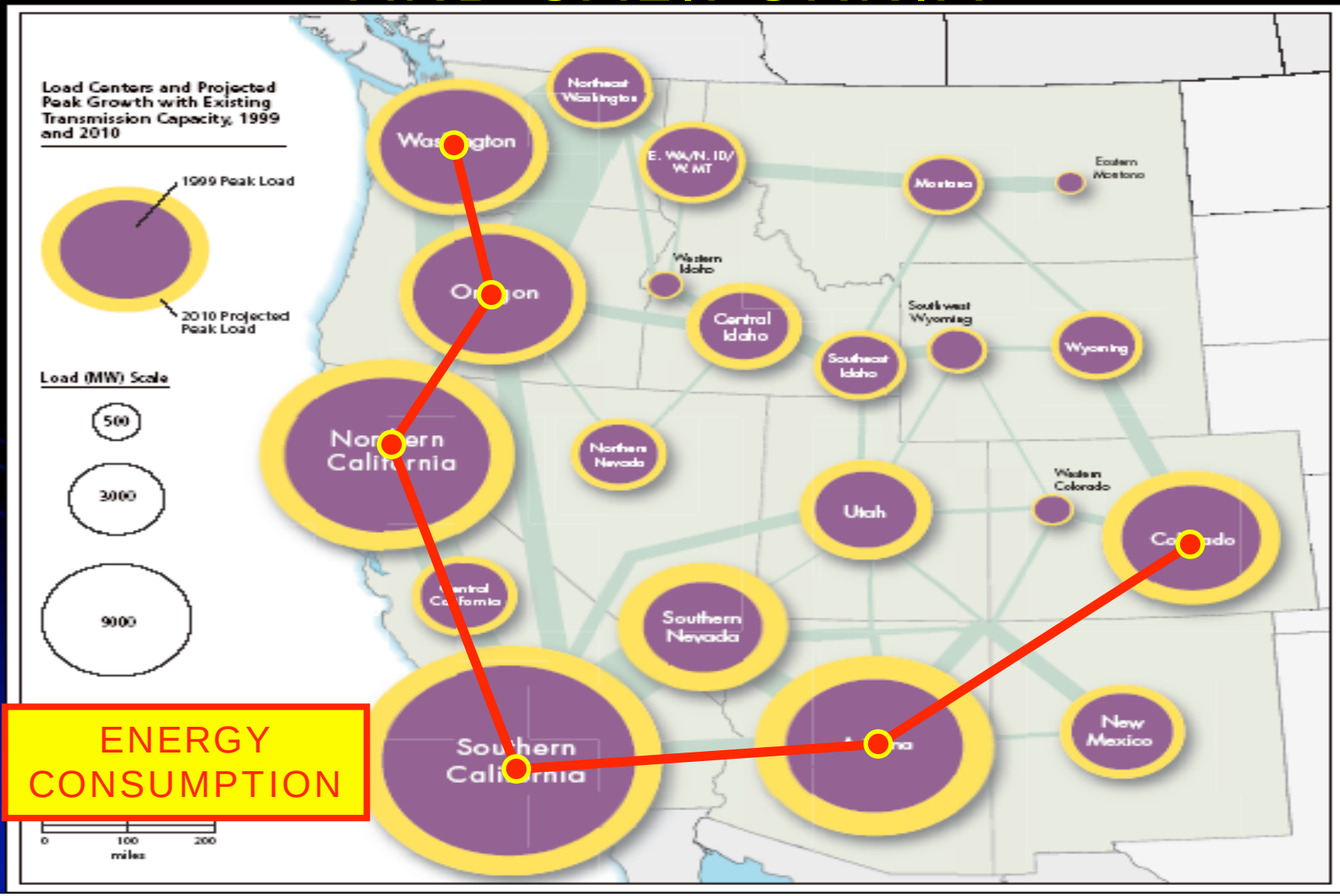

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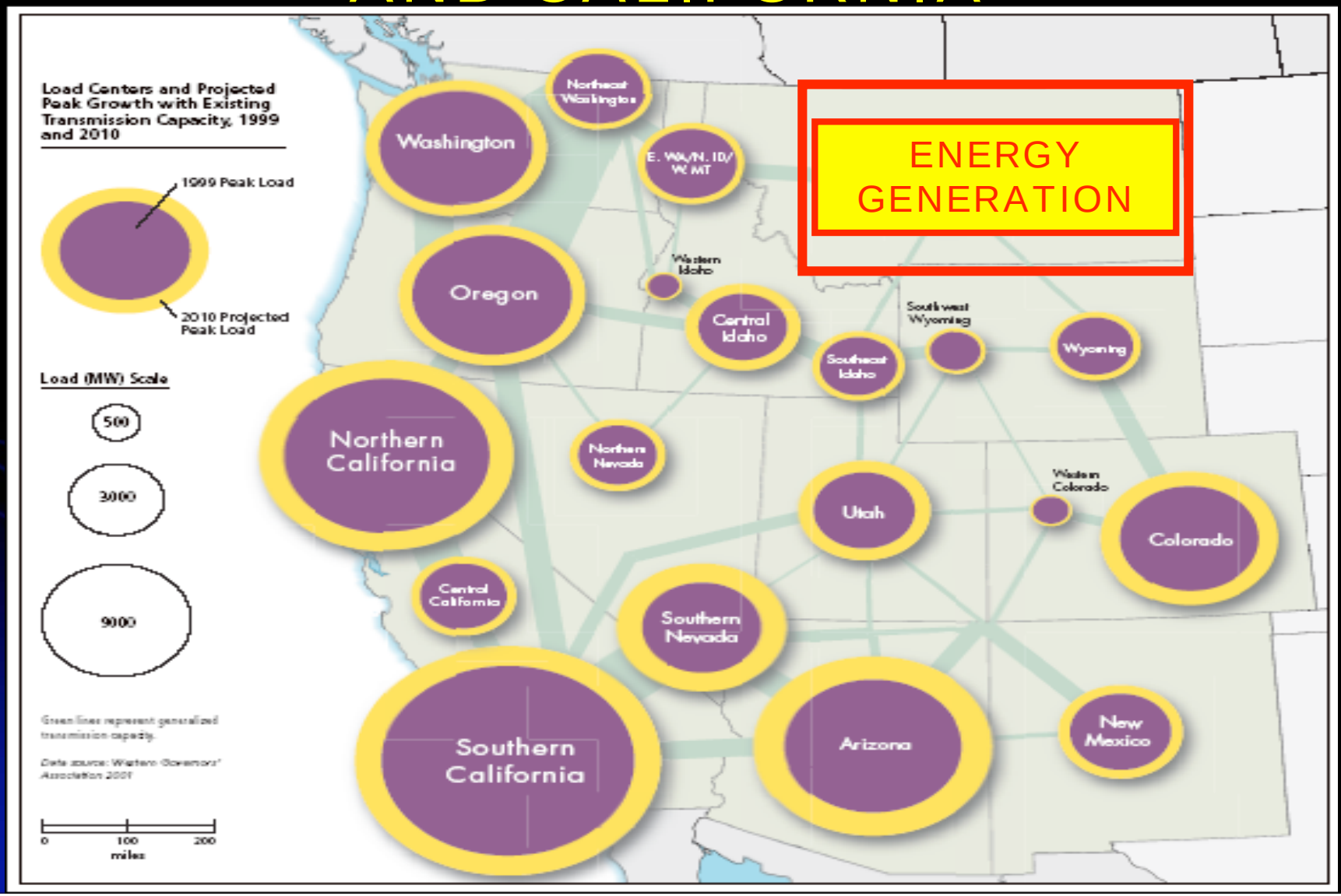

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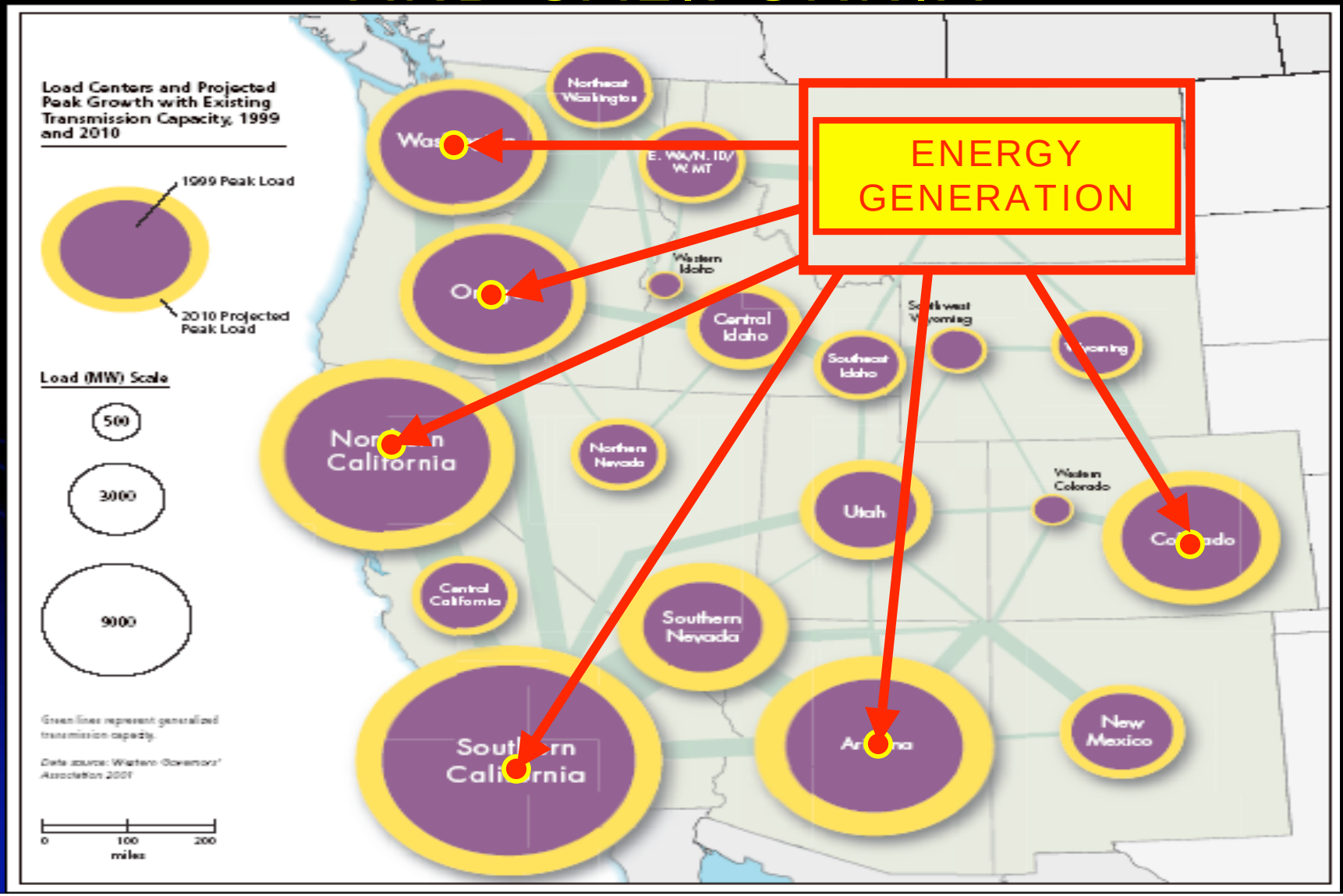


To do that ... we need more transmission lines from Montana to the emerging markets

# Potential Electric Transmission Projects for Montana

## Northern Lights HVDC* Line

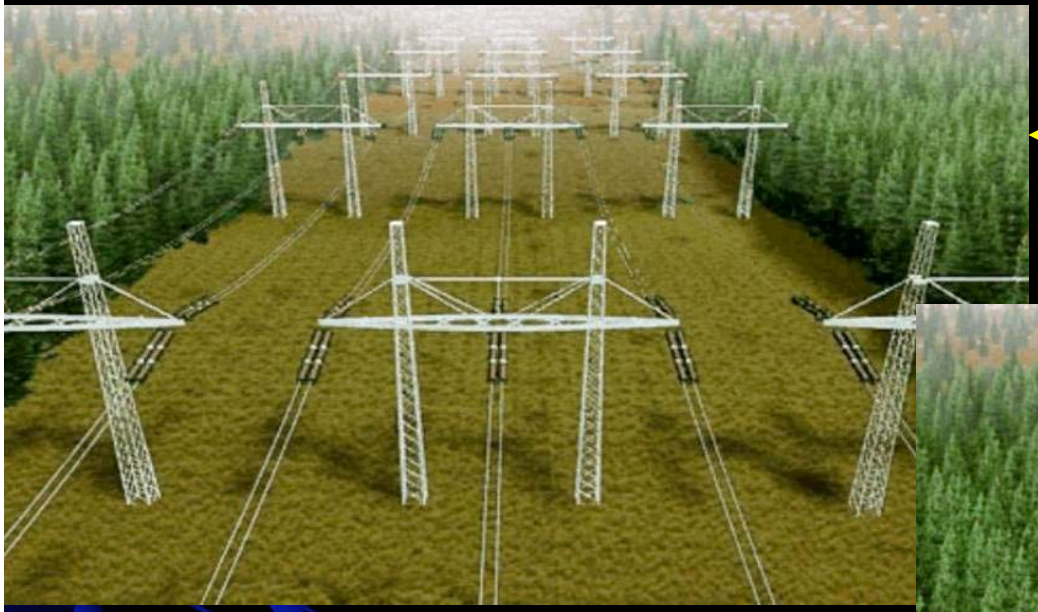
(* High Voltage Direct Current)

In pre-permitting discussions!

# DC is Environmentally Superior

## EASIER PERMITTING

AC Corridor with 3 @ 500kV lines, for a total capacity of 3000-4000 MW



DC Corridor with 1 @ 500kV bi-pole line, for a total capacity of 3000 MW

## LESS LINE LOSS

# The NorthernLights Project

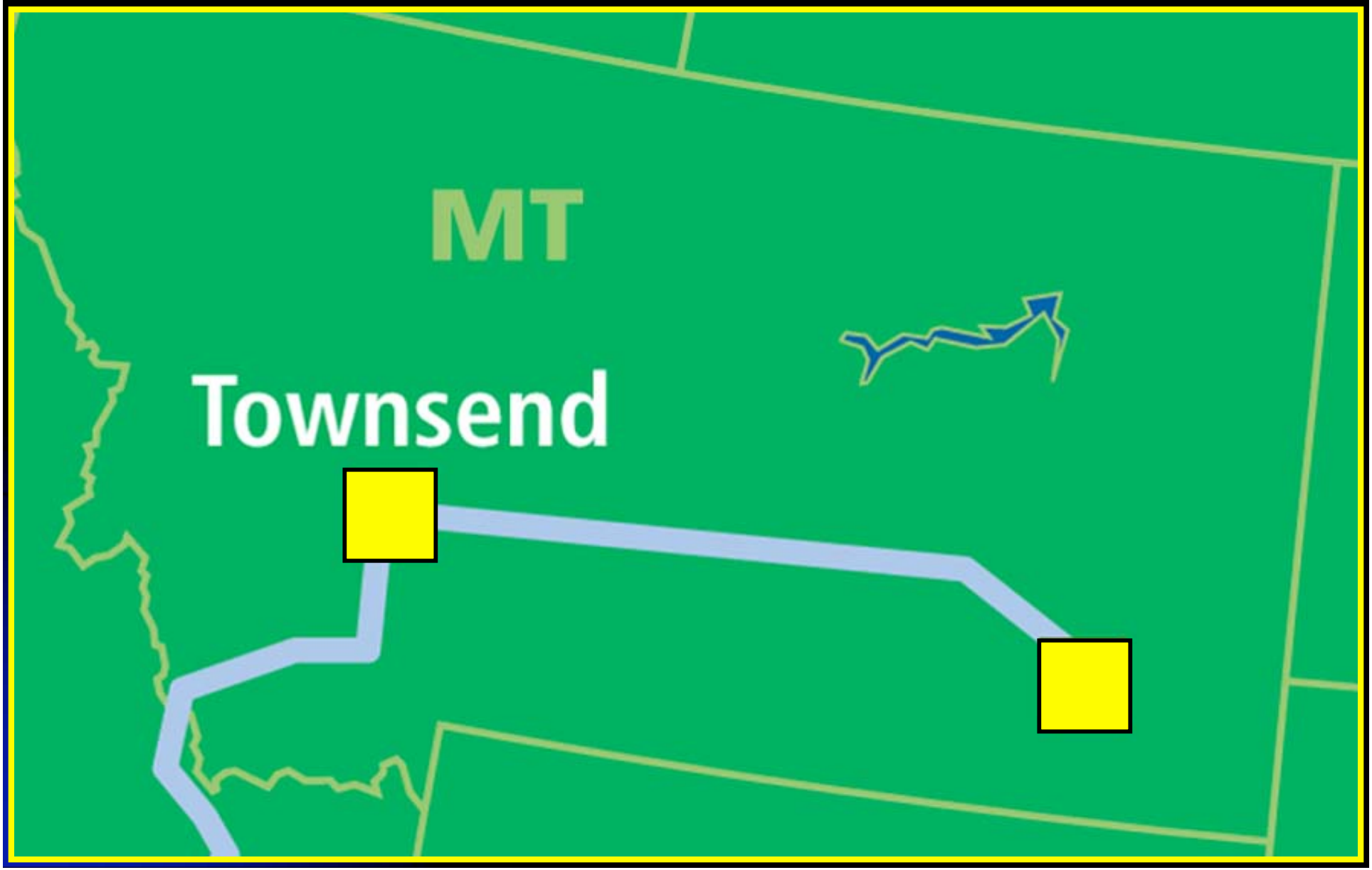
# Northern Lights Project

## Estimated Value of Project

Total: $2 Billion est.

Montana: $600+ Million est.

# Up to 3500 MW of Power



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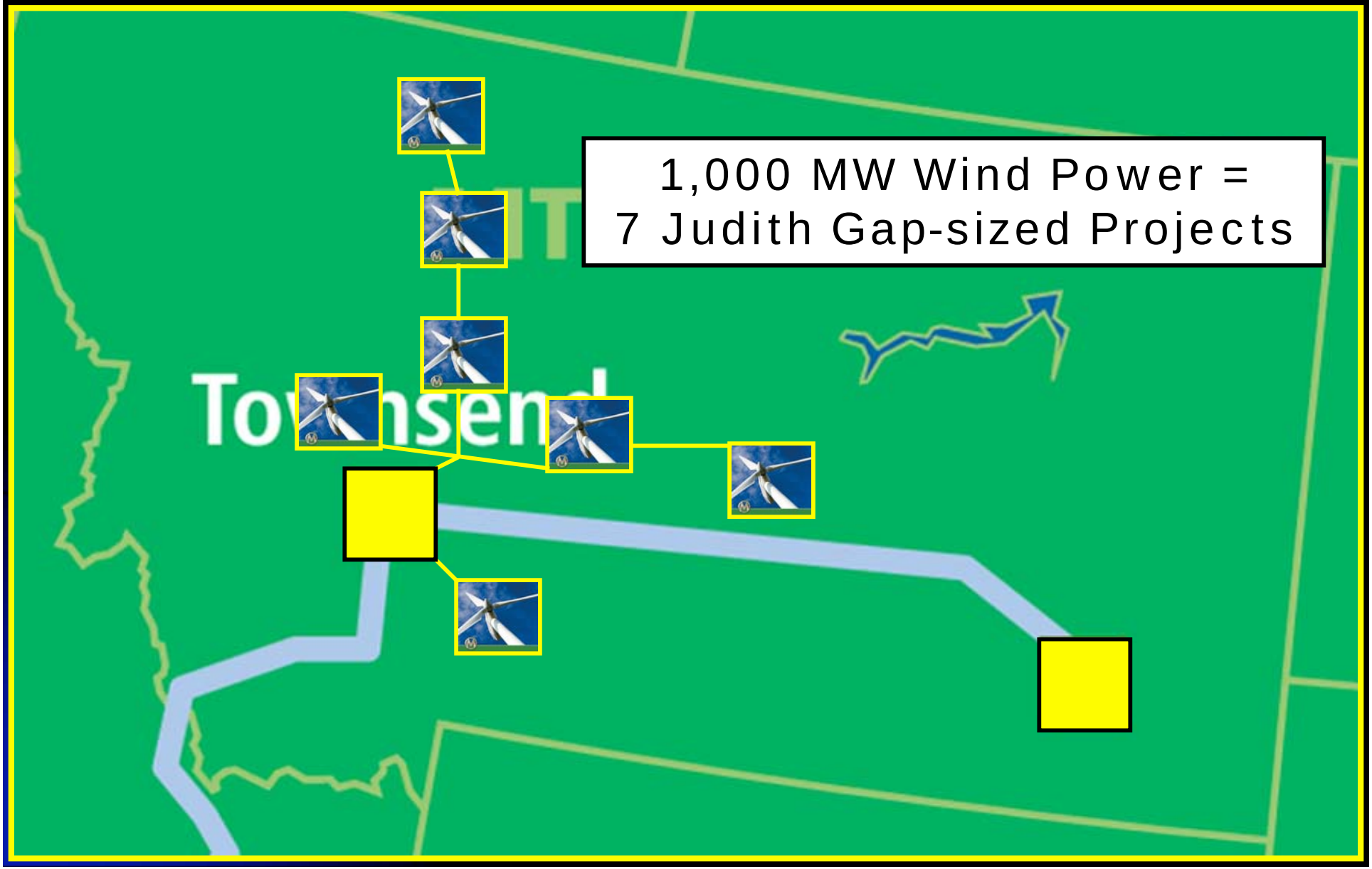

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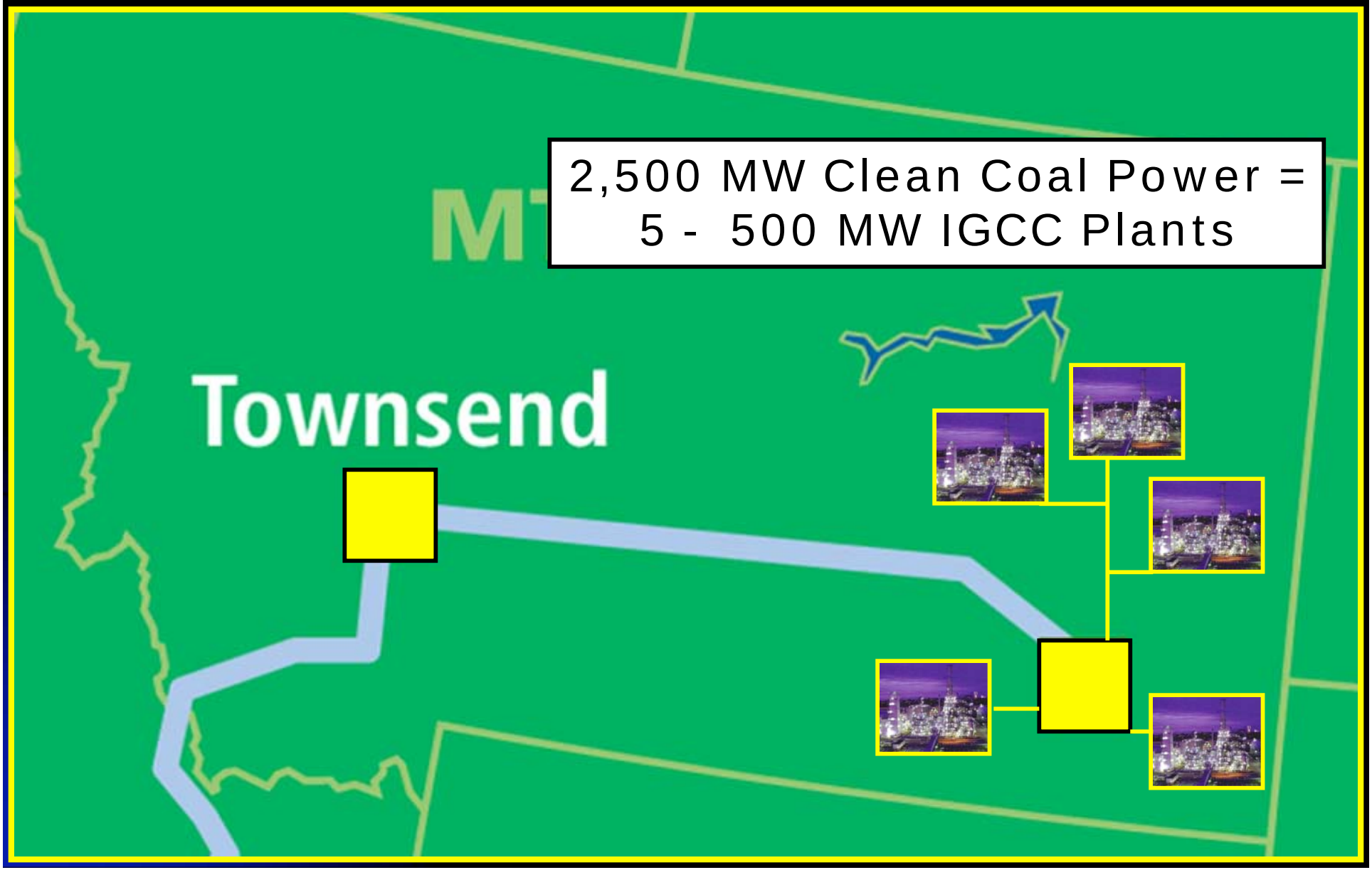

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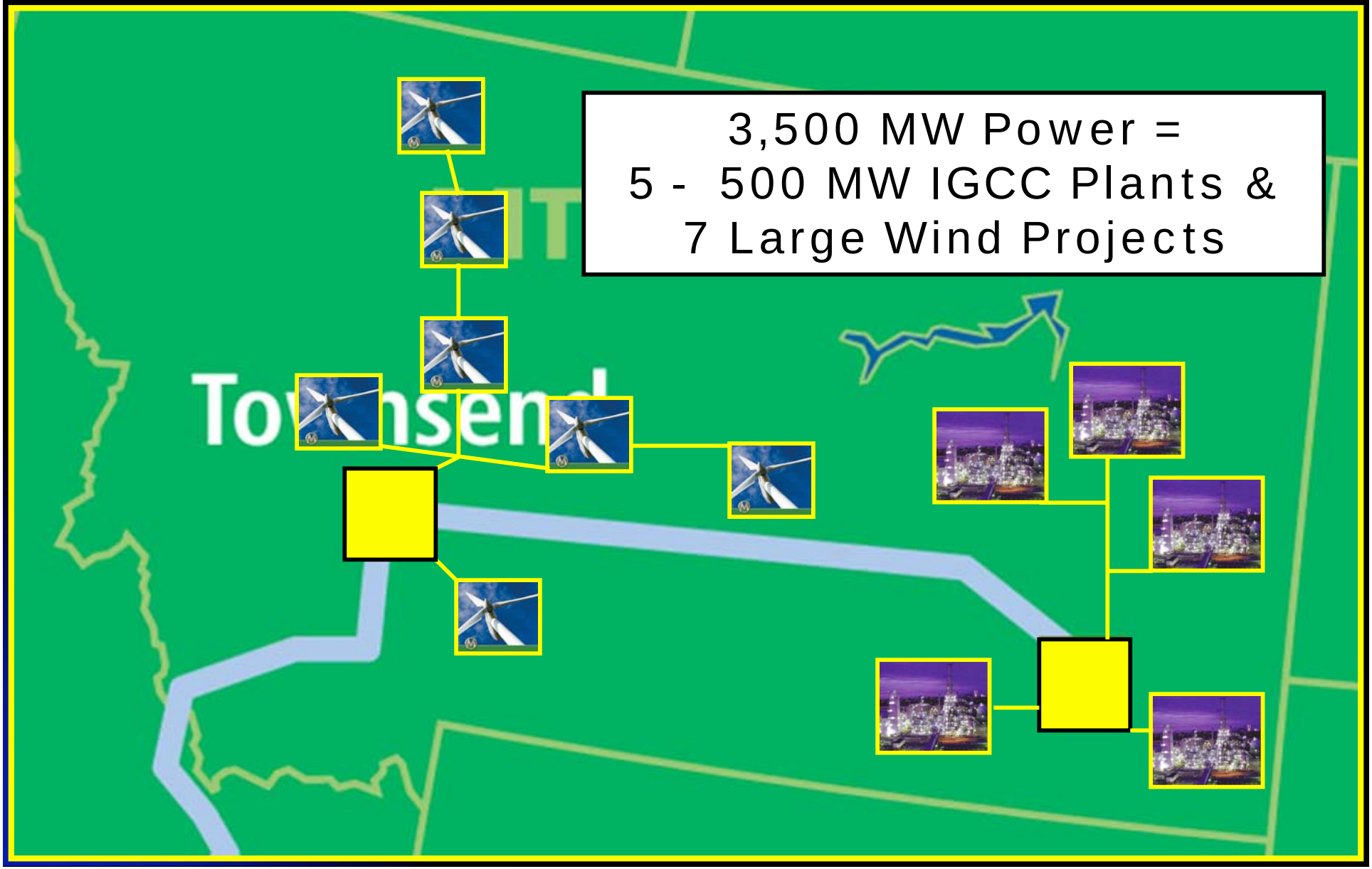

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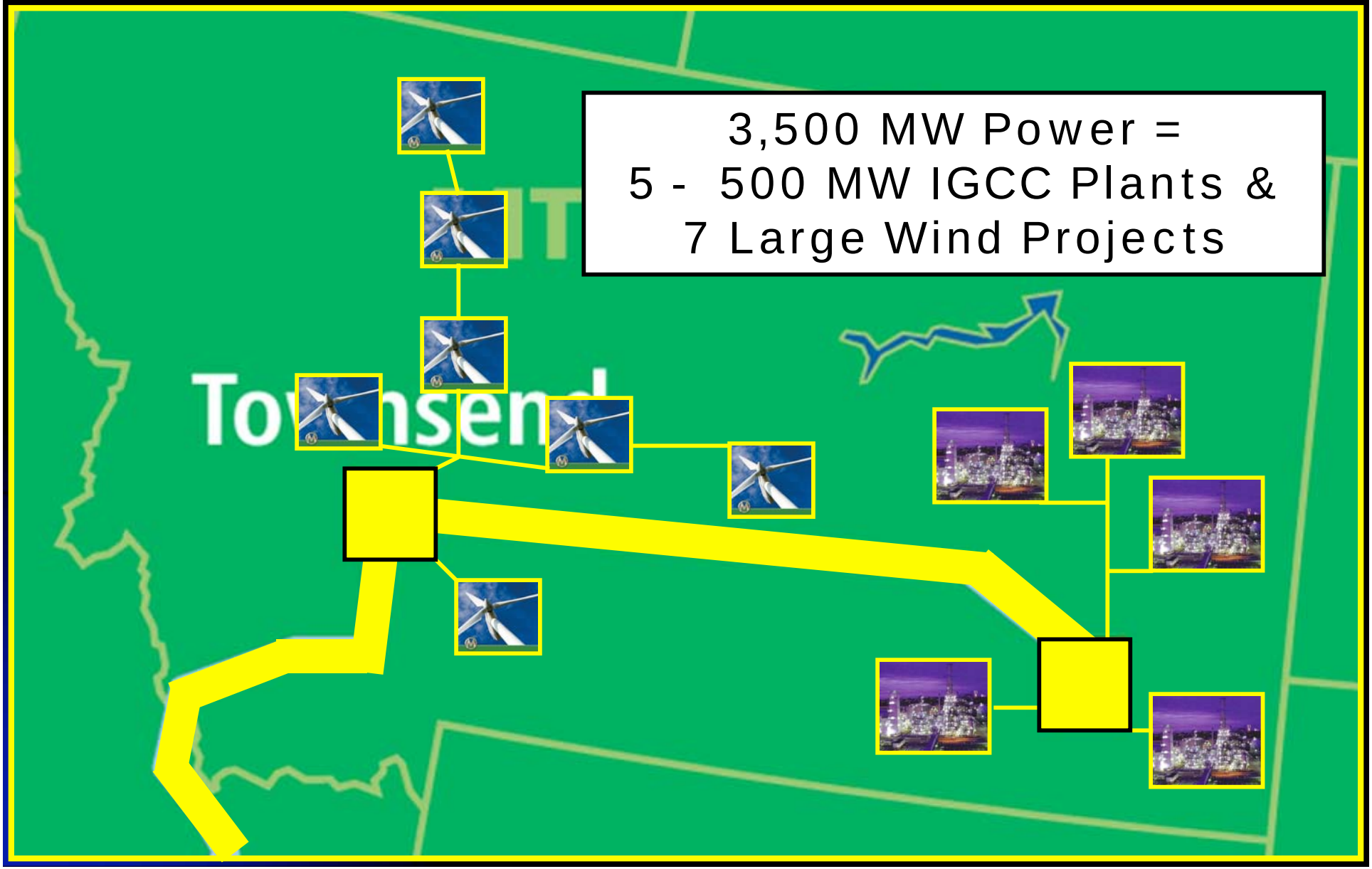


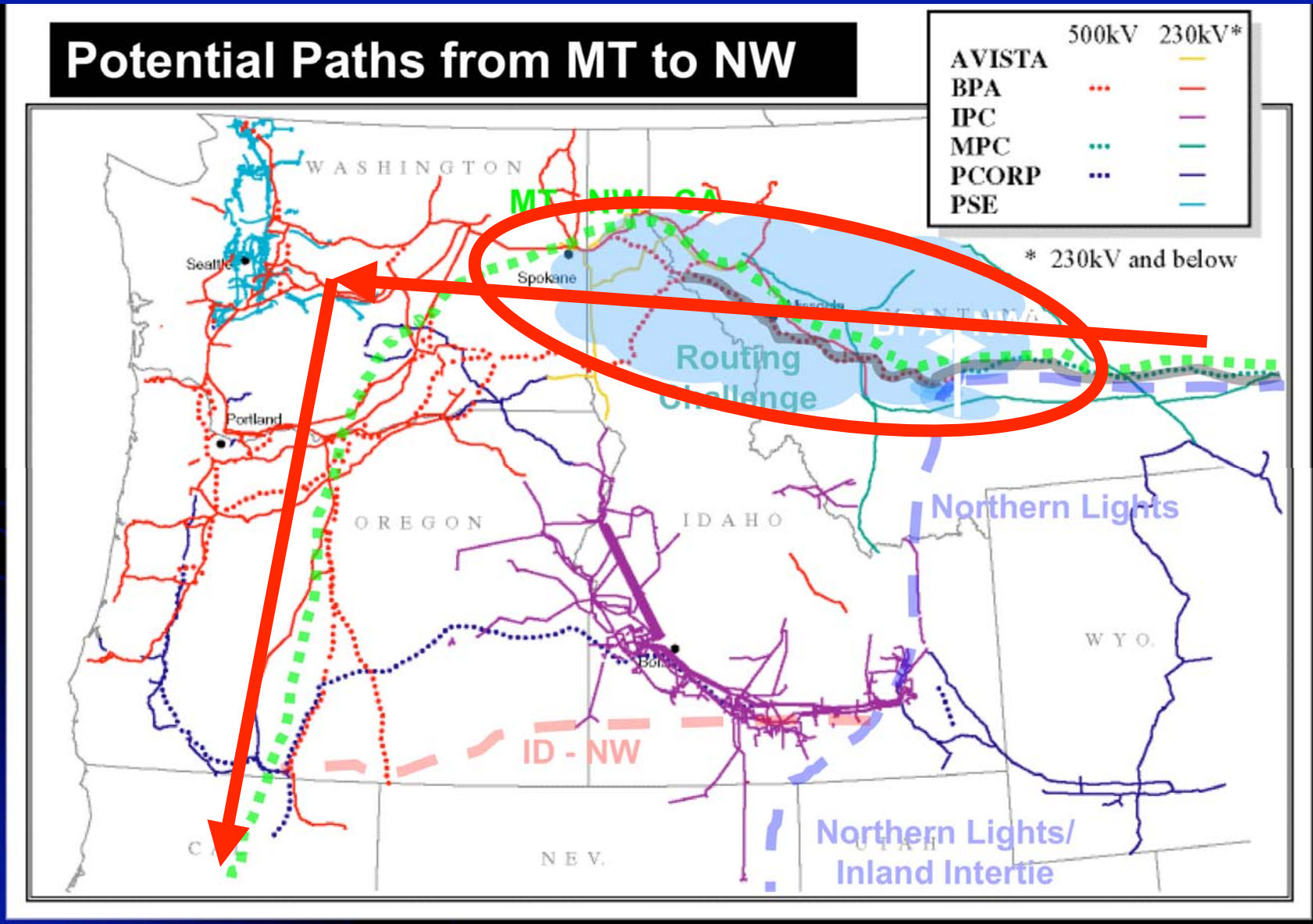
# Frontier Line – Concept 1

Blue is Possible Montana Interconnect (added)

# Frontier Line – Concept 2

Blue is Possible Montana Interconnect (added)

# Increasing Transfers from MT to NW



# BPA Increasing Transfers from MT to NW

- Potential for as much as 750 MW of additional capacity from Colstrip area to Puget Sound area with no 500-kV line construction.
- Cost approximately $375 - $450 million

**NOTE:** This information is based on high level studies and has not been confirmed by detailed studies

# Governor's Office of Economic Development

## Contact Information


**Governor's Office of Economic Development**

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**1-406-444-5634**

www.business.mt.gov

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